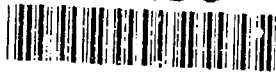


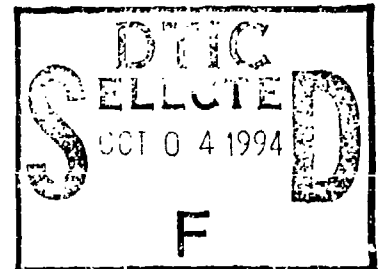
AD-A285 181



Whole-body Vibration Assessment of the Palletized Load System

By

Al W. Moran
Bradley S. Erickson
Tammy L. Simmons
Barclay P. Butler



Aircrew Protection Division

July 1994

94-31401



Approved for public release; distribution unlimited

10
United States Army Aeromedical Research Laboratory
Fort Rucker, Alabama 36362-0577

Notice

Qualified requesters

Qualified requesters may obtain copies from the Defense Technical Information Center (DTIC), Cameron Station, Alexandria, Virginia 22314. Orders will be expedited if placed through the librarian or other person designated to request documents from DTIC.

Change of address

Organizations receiving reports from the U.S. Army Aeromedical Research Laboratory on automatic mailing lists should confirm correct address when corresponding about laboratory reports.

Disposition

Destroy this document when it is no longer needed. Do not return it to the originator.

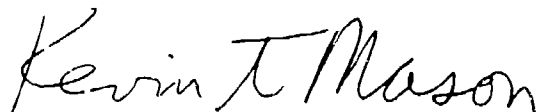
Disclaimer

The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other official documentation. Citation of trade names in this report does not constitute an official Department of the Army endorsement or approval of the use of such commercial items.

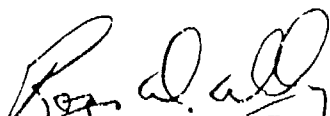
Human use

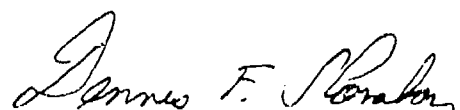
Human subjects participated in these studies after giving their free and informed voluntary consent. Investigators adhered to AR 70-25 and USAMRDC Reg 70-25 on Use of Volunteers in Research.

Reviewed:


KEVIN T. MASON
LTC, MC, MFS
Director, Aircrew Protection
Division

Released for publication:


ROGER W. WILBY, O.D., Ph.D.
Chairman, Scientific
Review Committee


DAVID H. KARNEY
Colonel, MC, SFS
Commanding

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION Unclassified			1b. RESTRICTIVE MARKINGS	
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release, distribution unlimited	
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE				
4. PERFORMING ORGANIZATION REPORT NUMBER(S) USAARL Report No. 94-33			5. MONITORING ORGANIZATION REPORT NUMBER(S)	
6a. NAME OF PERFORMING ORGANIZATION U.S. Army Aeromedical Research Laboratory		6b. OFFICE SYMBOL (If applicable) SGRD-UAD-IV		7a. NAME OF MONITORING ORGANIZATION U.S. Army Medical Research, Development, Acquisition and Logistics Command (Provisional)
6c. ADDRESS (City, State, and ZIP Code) P.O. Box 620577 Fort Rucker, AL 36362-0577		7b. ADDRESS (City, State, and ZIP Code) Fort Detrick Frederick, MD 21702-5012		
8a. NAME OF FUNDING / SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (If applicable)		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code)		10. SOURCE OF FUNDING NUMBERS		
		PROGRAM ELEMENT NO. 62787A	PROJECT NO. 80162787A878	TASK NO. FA
		WORK UNIT ACCESSION NO. 145		
11. TITLE (Include Security Classification) Whole-body vibration assessment of the Palletized Load System				
12. PERSONAL AUTHOR(S) Al W. Moran, Bradley S. Erickson, Tammy L. Simmons, and Barclay P. Butler				
13a. TYPE OF REPORT Final		13b. TIME COVERED FROM _____ TO _____		14. DATE OF REPORT (Year, Month, Day) 1994 July
15. PAGE COUNT 95				
16. SUPPLEMENTARY NOTATION				
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB-GROUP		
20	11		Whole-body vibration, health hazard assessment, exposure limits, tactical vehicles, terrain, crewmembers	
08	07			
19. ABSTRACT (Continue on reverse if necessary and identify by block number) An evaluation of all new tactical vehicles and aircraft is required to assess potential whole-body vibration (WBV) health hazards to crewmembers. As requested by the U.S. Army Environmental Hygiene Agency, a health hazard assessment (HRA) was performed by the U.S. Army Aeromedical Research Laboratory (USAARL) on the Palletized Load System (PLS) truck. The PLS was tested on five cross-country courses at Aberdeen Proving Ground, MD, by the U.S. Army Combat Systems Test Activity in coordination with the Response and Tolerance Branch of USAARL. The PLS was tested with speeds ranging from 3 to 20 mph. The results of these tests show that, for the worst-case scenario for each course, the lowest tolerances for WBV were on course 5. Less severe WBV occurred on courses 1 and 3, which had near equal tolerances, followed by course 4. Finally, the highest tolerances for WBV exposure were on course 2. The results also show that both driver and passenger were exposed to a Hazard Severity-Category III (marginal), with a Hazard Probability-Level C (occasional). The overall Risk Assessment Code (RAC) was 3. This indicates the PLS does not present a significant health risk to its crewmembers.				
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION Unclassified	
22a. NAME OF RESPONSIBLE INDIVIDUAL Chief, Science Support Center			22b. TELEPHONE (Include Area Code) 205-255-6907	2c. OFFICE SYMBOL SGRD-UAX-SI

Acknowledgments

The authors would like to express their gratitude to Dr. Nabih Alem for his efforts in developing software for the data analysis. Ms. Mary Gramling and Mr. Udo Volker Nowak also are commended for their efforts in the editing of this report.

Accession For	
NTIS CRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution /	
Availability Codes	
Dist	Avail & or Special
A-1	

This page intentionally left blank.

Table of contents

	Page
List of figures	2
List of tables	2
Introduction	3
Methods	5
Results	9
Discussion	12
Conclusion	12
References	13
Appendix A: List of manufacturers	14
Appendix B: ISO 2631 data plots and graphs	15

List of figures

Figure	Page
1. Palletized Load System Truck	3

List of tables

Table	Page
1. WBV test matrix	5
2. Hazard severity classification	7
3. Hazard probability classification	8
4. RAC determination	8
5. Driver seat health and safety exposure limits	10
6. Passenger seat health and safety exposure limits . . .	11

Introduction

All new tactical vehicles and aircraft are required to be evaluated for potential whole-body vibration (WBV) health hazards to their crewmembers. This requirement is contained in AR 40-10, "Health hazard assessment program in support of the Army materiel acquisition decision process." In support of this program, the U.S. Army Aeromedical Research Laboratory (USAARL) was requested by the U.S. Army Environmental Hygiene Agency (USAEHA) to perform a Health Hazard Assessment (HHA) on the Palletized Load System (PLS) Truck.*

The PLS, shown in Figure 1, is a family of all wheel drive (10X10) vehicles and trailers that are equipped with material handling equipment. The PLS vehicles are designated as follows: the M1074 truck (with a crane), the M1075 truck (without a crane), the M1076 trailer and the M1077 flatrack. The PLS is capable of attaining a maximum speed of 90.1 km/h and has a range of 362 km.

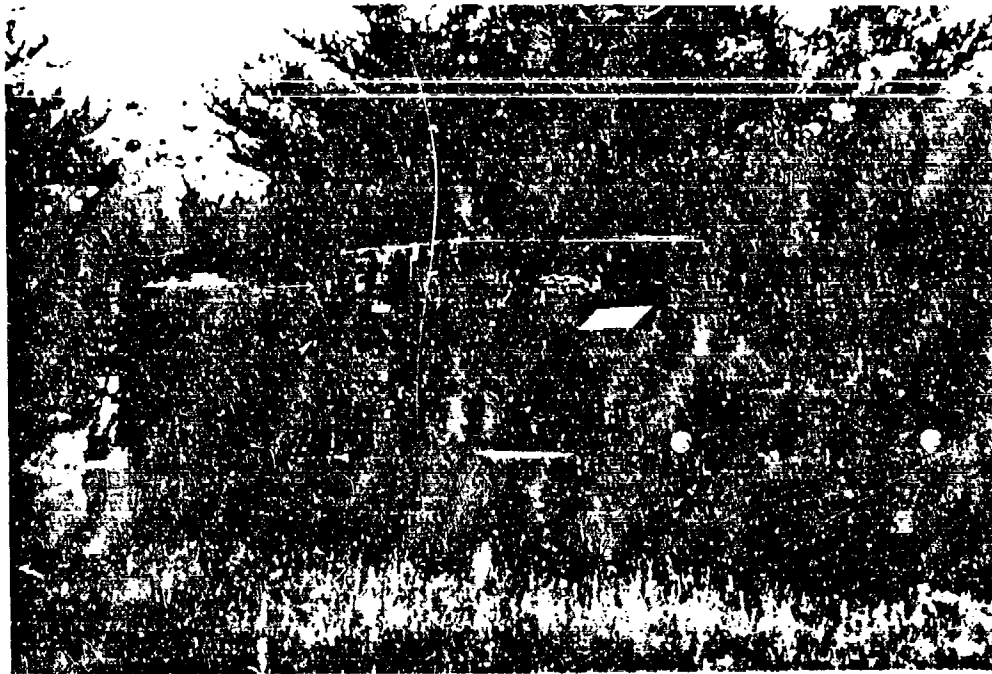


Figure 1. Palletized Load System Truck.

* See list of manufacturers.

The PLS truck is a Kenworth diesel tractor with a stakebed body equipped with the M1077 cargo "flatrack" in lieu of a fixed truck bed. The trucks have a load capacity of 16.5 tons of payload mounted on the flatrack; the truck also can tow an M1076 trailer loaded with an additional 16.5 tons of flatrack cargo. The flatrack can be lowered to the ground behind the vehicle by the driver in the cab using a unique hydraulic system which allows a 16.5-ton flatrack to be loaded or unloaded from the cab in less than 1 minute.

The unique loading/unloading capabilities of the PLS provide a significant reduction in the time required for the issue of cargo. Because of this capability, PLS vehicles are employed by artillery transportation units for the supply and resupply of ammunition. As such, the PLS will be employed primarily over cross-country terrain, where vehicle load, speed, and terrain define the conditions for measuring WBV signatures.

The methods for measuring and analyzing WBV are found in the International Organization for Standardization's (ISO) guideline entitled "Guide for the evaluation of human exposure to whole-body vibration (ISO 2631)." ISO 2631 is reflected in MIL-STD-1472D, "Human engineering design criteria for military systems, equipment and facilities." The relative severity of the processed WBV signatures are interpreted using the Risk Assessment Codes (RAC) found in AR 40-10. These publications, as a set, define the criteria used in evaluating the WBV signatures of the PLS.

ISO 2631 identifies three criteria for the evaluation of human exposure to WBV which can be described in terms of intensity, frequency, direction, and duration. These criteria are the preservation of comfort, the preservation of working efficiency, and the preservation of health or safety. They are known formally as the reduced comfort boundary (RCB), fatigue-decreased proficiency boundary (FDPB), and the exposure limit (EL), respectively.

The RACs, as described in Appendix B of AR 40-10, require the classification of a health hazard according to its severity and probability. Processing vibration signatures using ISO-2631 results in measurements of vibration severity, but does not yield a measure of the probability of occurrence. RACs are obtained by combining vibration severity with the probability that the test condition will occur in a real life scenario. For vibration, RACs would be determined for each vibration amplitude for each direction and frequency.

Methods

Whole-body vibration data for the PLS truck were collected at Aberdeen Proving Ground (APG), Maryland, by Waterways Experiment Station (WES) in coordination with the U.S. Army Combat Systems Test Activity (USACSTA) and then sent to the Response and Tolerance Branch of USAARL for evaluation. A test matrix was developed that represented the planned operating environment of the PLS truck with respect to terrain type and vehicle speed (Table 1).

Experimental conditions

The PLS truck was tested over five cross-country test courses in a loaded configuration for WBV assessment. These courses are part of the APG test track facilities. Paved road terrains were not tested since the WBV tolerance results typically are higher than those of cross-country terrains. Exact characterizations of the cross country-surfaces can be obtained from APG (U.S. Army Human Engineering Laboratory, 1991).

Table 1.

Test matrix for WBV testing of the PLS truck.

Cross-country					
Speed (mph)	Course #1	Course #2	Course #3	Course #4	Course #5
3					X
5	X	X	X	X	X
6					X
7					X
8				X	
9				X	
10	X	X	X	X	
13	X	X		X	
14	X				
15	X		X		
18			X		
20			X		

The PLS truck was tested using vehicle speeds ranging from 3 to 20 mph. Specific vehicle speeds were selected to mirror likely employment scenarios for each cross-country terrain test track. On course 1, the PLS truck was tested at five speeds: 5, 10, 13, 14, and 15 mph. Course 2 test speeds were 5, 10, and 13 mph. On the third course, the PLS was tested at five speeds: 5, 10, 15, 18, and 20 mph. Test speeds were 5, 8, 9, 10, and 13 mph on the fourth course. Finally, the PLS was tested on course 5 at 3, 5, 6, and 7 mph.

Instrumentation

Seat accelerations were obtained in the Z-axis (vertical) for the driver and passenger seats of the PLS using the WES hybrid ride meter. The ride meter captured acceleration signals using a microprocessor controlled analog-to-digital (A/D) converter, digital input/output controller, and memory. This system was connected to four Z-axis aligned accelerometers with two of the accelerometers fixed to the passenger and driver seat pads, and two of the accelerometers fixed to the M1 hull underneath each seat. The accelerometer signals were weighted and integrated by the WES hybrid ride meter and then digitized by the A/D converter. Processed data was stored in digital format on an IBM lap-top computer. A more detailed characterization of the instrumentation (U.S. Army Corps of Engineers, 1987) can be obtained from Instrumentation Services Division, Waterways Experiment Station, Vicksburg, Mississippi 39180-0631.

Analysis

Single-axis seat pad vibration data were processed using the methods prescribed in ISO 2631 for broadband signals using third-octave analysis with weighting. Digitized acceleration signals from the z-axis from both the driver and passenger seat pad accelerometers were read into a Dolch* model 486 portable computer. A USAARL-developed automated analysis program was used to produce tabular and graphic plots of the acceleration data. These plots (Appendix B) were used to identify vibration exposure limits which occurred under projected normal daily operating conditions.

The RACs require classification of the health hazard according to the hazard severity and probability. Since the ISO 2631 standard does not use RACs, the severity of the hazard may be reasonably estimated from worst-case exposure before the onset of ELs for each vibration frequency and direction. An indicator which may be used for the assessment of hazard severity is the duration of safe exposure (DSE). The DSE is defined as the length of time a person can be exposed to WBV before reaching the

health and safety exposure limit (HSEL). Thus, a long DSE indicates tolerable WBV, whereas a short DSE indicates severe WBV. In order to translate the DSEs to RACs, Table 2 was used to define the category (I-IV) of exposure.

Table 2.

Hazard severity classification.

Attribute	Category	WBV duration of safe exposure
Catastrophic	I	Less than 5 minutes
Critical	II	Between 5 and 30 minutes
Marginal	III	Between 30 minutes and 4 hours
Negligible	IV	More than 4 hours

Hazard severity categories are defined as:

Category I - Catastrophic: Hazard may cause death or total loss of a bodily system.

Category II - Critical: Hazard may cause severe bodily injury, severe occupational illness, or major damage to a bodily system.

Category III - Marginal: Hazard may cause minor bodily injury, minor occupational illness, or minor damage to a bodily system.

Category IV - Negligible: Hazard would cause less than minor bodily injury, minor occupational illness, or minor bodily system damage.

The operational environments of the PLS truck determine the likelihood of occurrence, or probability level, of exposure to WBV. These levels, identified as levels A through E in AR 40-10, with their corresponding operating conditions relevant to the WBV signatures in the PLS truck, are listed in Table 3.

Operating the PLS over cross-country terrains represents the primary portion of its mission, therefore, each cross-country course was assigned a hazard probability level according to the likelihood of actual occurrence. The assignment of the levels was based on the severity of the track terrain and the range of test speeds. The PLS was tested only for its primary operating

scenario (cross-country) with no other terrain considered in the final determination of RAC.

Table 3.

Hazard probability classification.

Attribute	Level	Road/terrain type, operating speed
Frequent	A	Cross-country, course 3, 5-15 mph; course 1, 5 mph and under
Probable	B	Cross-country, course 1, 10-13 mph; course 2, 5-13 mph; course 4, 5-10 mph;
Occasional	C	Cross-country, course 1, 14-15 mph; course 3, 18-20 mph; course 4, 13 mph
Remote	D	Cross-country, course 5, 5-7 mph
Improbable	E	Conditions not likely to occur

Hazard severity categories and levels used to find the RACs for each test condition. Using Table 4, the RACs are found at the intersection of the hazard category and hazard probability level. The overall RAC is then determined by weighting the individual RACs according to the percent of mission time represented by the test run, and then averaging and rounding to produce a final RAC.

Table 4.

RAC determination.

Hazard category	Hazard probability levels				
	A	B	C	D	E
I	1	1	1	2	3
II	1	1	2	3	4
III	2	3	3	4	5
IV	3	5	5	5	5

Results

The duration of exposure (in hours) necessary to reach the HSEL was calculated for all 46 data sets for Z-axis acceleration. Since the PLS truck mission requires 10 hours of operation over cross-country terrain, the exposure times of less than 10 hours were flagged for assessment.

The RAC categories and levels for each test course were determined using Tables 2 and 3. The hazard categories and hazard probability levels were combined for each test condition using Table 4. The resulting data are shown in Tables 5 and 6 for driver and passenger, respectively. These results are listed in order of DSE for each test condition. The DSE is determined from the time required to reach the HSEL (Appendix B) according to ISO-2631. The RAC is a measure of the hazard severity of the test condition and is based on the DSE, course terrain, and speed.

The worst-case exposure limits for the cross-country test courses were determined from each test's lowest DSE. The worst case DSEs for course 1 indicate that exposure to WBV be limited to 2.1 hours. Course 2 exposure time is limited to 4 hours of WBV. The exposure limit for WBV for course 3 was determined to be 2 hours. WBV exposure is limited to no more than 2.25 hours for course 4. Finally, the exposure limit for course 5 indicates that WBV exposure be restricted to 1.4 hours.

The DSEs below 10 hours ranged from a low of 1.433 and 1.6 hours and a high of 9.4 and 8.767 hours for driver and passenger, respectively. The hazard severity was assigned to each condition according to the DSE. These categories consistently were either marginal or negligible for both passenger and driver. With the combination of marginal or negligible hazard severity and exposure probabilities ranging from A to E, the RACs were calculated to be predominantly 3s and 5s for both driver and passenger.

As can be seen from Tables 5 and 6, the majority of the frequencies at which the exposure limits were reached were at 2 Hz. In the case of the driver's seat, approximately 82 percent of the HSELs that were below 10 hours occurred at a frequency of 2 Hz, which is outside the range of whole-body resonance frequencies (4 to 8 Hz). About 18 percent of the HSELs below 10 hours for the driver's seat occurred at the edge of whole-body resonance at 4 Hz. This pattern was similar for the passenger's seat with approximately 78 percent of HSELs below 10 hours occurring at 2 Hz and about 11 percent occurring at 4 Hz.

Table 5.

Driver seat HSEL for times of less than 10 hours with respect to Z-axis, vibration frequency, vehicle speed, and test course.

Determination of RAC category				Determination of RAC level				Overall RAC
DSE	Hz	Hazard severity	RAC category	Test course	Speed (MPH)	Exposure probability	RAC level	
1.433	2	Marginal	III	5	7	Remote	D	4
1.9	2	Marginal	III	5	6	Remote	D	4
1.95	2	Marginal	III	3	20	Frequent	A	2
2.117	2	Marginal	III	1	15	Probable	B	3
2.167	2	Marginal	III	1	14	Probable	B	3
2.25	2	Marginal	III	4	8	Occasional	C	3
2.283	4	Marginal	III	3	18	Frequent	A	2
2.583	4	Marginal	III	4	13	Occasional	C	3
3.983	2	Marginal	III	2	13	Occasional	C	3
4.1	2	Negligible	IV	4	9	Occasional	C	5
4.15	2	Negligible	IV	1	10	Probable	B	5
4.367	2	Negligible	IV	2	5	Occasional	C	5
4.517	2	Negligible	IV	4	5	Occasional	C	5
5.567	2	Negligible	IV	2	10	Occasional	C	5
5.85	2	Negligible	IV	1	13	Probable	B	5
6.067	2	Negligible	IV	5	5	Remote	D	5
9.4	4	Negligible	IV	4	10	Occasional	C	5

Table 6.

Passenger seat HSEL for times of less than 10 hours with respect to
3-axis, vibration frequency, vehicle speed, and test course.

Determination of RAC category				Determination of RAC level				Overall RAC
DSE	H _z	Hazard severity	RAC category	Test course	Speed (MPH)	Exposure probability	RAC level	
1.6	2	Marginal	III	5	7	Remote	D	4
1.783	2	Marginal	III	3	20	Frequent	A	2
2.133	1	Marginal	III	5	6	Remote	D	4
2.217	2	Marginal	III	1	15	Probable	B	3
2.35	2	Marginal	III	1	14	Probable	B	3
2.55	4	Marginal	III	4	13	Occasional	C	3
2.617	2	Marginal	III	3	18	Frequent	A	2
2.783	2	Marginal	III	4	8	Occasional	C	3
3.817	2	Marginal	III	1	10	Probable	B	3
4.1	2	Negligible	IV	4	9	Occasional	C	5
4.467	2	Negligible	IV	1	10	Probable	B	5
4.783	2	Negligible	IV	4	5	Occasional	C	5
4.933	2	Negligible	IV	2	5	Occasional	C	5
5.05	2	Negligible	IV	2	10	Occasional	C	5
5.05	2	Negligible	IV	5	5	Remote	D	5
6.233	2	Negligible	IV	1	13	Probable	B	5
7.283	3.17	Negligible	IV	4	10	Occasional	C	5
8.767	4	Negligible	IV	3	10	Frequent	A	3

Discussion

For the worst-case scenario for each test course, WBV exposure tolerances were lowest for cross-country course 5, with limits of 1.433 and 1.6 hours for driver and passenger, respectively. Courses 1 and 3 had near equal tolerances with course 1 limited to 2.1 hours for the driver and 2.2 hours for the passenger, and course 3 being limited to 2 and 2.1 hours for driver and passenger, respectively. Courses 1 and 3 were followed by course 4 with driver and passenger WBV tolerances of 2.25 and 2.8 hours, respectively. Course 2 had the highest tolerance with 4 and 3.8 hours for driver and passenger, respectively.

Comparison of the exposure limits for passenger and driver shows that the differences were slight, indicating that seating position had little effect on WBV exposure for the cross-country terrain. Also, the majority of the exposure limits for both passenger and driver occurred at a frequency of 2 Hz. This indicates that WBV does not present a significant health risk to the passenger and driver where WBV resonance is concerned because the frequency lies outside of the WBV resonance range (4 to 8 Hz). Another indication that the PLS does not pose a significant risk to the crewmembers is the combination of the hazard categories and the hazard probability levels. This combination resulted in RACs of 3s and 5s which signifies that WBV exposure is in the mid-to-low range of probability and severity.

Conclusion

Results from this WBV HHA indicate both driver and passenger were exposed to a hazard severity-category III (marginal), with a Hazard Probability-level C (occasional), for an overall RAC of 3 (AR 40-10), during the operation of the PLS. This indicates that WBV in the tested PLS truck does not present a significant health risk to its crewmembers. However, it is recommended that, under normal operating conditions of the PLS, WBV exposure be limited to 4 hours in any 24-hour period.

References

- Department of the Army. 1991. Health hazard assessment program in support of the Army material acquisition decision process. Washington, DC: Department of the Army. AR 40-10.
- Department of Defense. 1989. Human engineering design criteria for military systems, equipment and facilities. Washington, DC: Department of Defense. MIL-STD-1472D.
- International Organization for Standardization. 1985. Evaluation of human exposure to whole-body vibration, Part 1: general requirements. ISO-2631. 2nd edition 1985-05-15.
- U.S. Army Corps of Engineers. 1987. Measurement of suspension and ride characteristics of the M1 main battle tank. Vicksburg, MS: Waterways Experiment Station.
- U.S. Army Human Engineering Laboratory. 1991. Soldier-machine performance field trails - ammunition loading of the palletized loading system. Aberdeen Proving Ground, MD: Technical Memorandum 12-91.

Appendix A.

List of manufacturers.

Hewlett-Packard Company
4700 Baylou Boulevard
Pensacola, FL 32502

Larson-Davis Laboratories
280 South Main
Pleasant Grove, UT 84062

Oshkosh Truck Corporation
PO Box 2566
Oshkosh, WI 54903

TEAC Corporation of America
7733 Telegraph Road
Montebello, CA 90640

Appendix B.

ISO 2631 tables and graphs.

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-02 P-seat

17-MAY-94 13:18:47

Sensor.... P-seat
Course.... #3 APG, 0-500 feet
Speed..... 5 mph
Vehicle... PLS truck
Date..... May 19, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	0.6100	0.4313	0:44	5:11	13:12
3.17	0.2300	0.2048	2:49	14:11	32:45
4.00	0.1300	0.1300	5:33	24:47	54:36
1.00	0.2600	0.1300	5:33	24:47	54:36
6.35	0.1200	0.1200	6:13	27:15	59:45

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

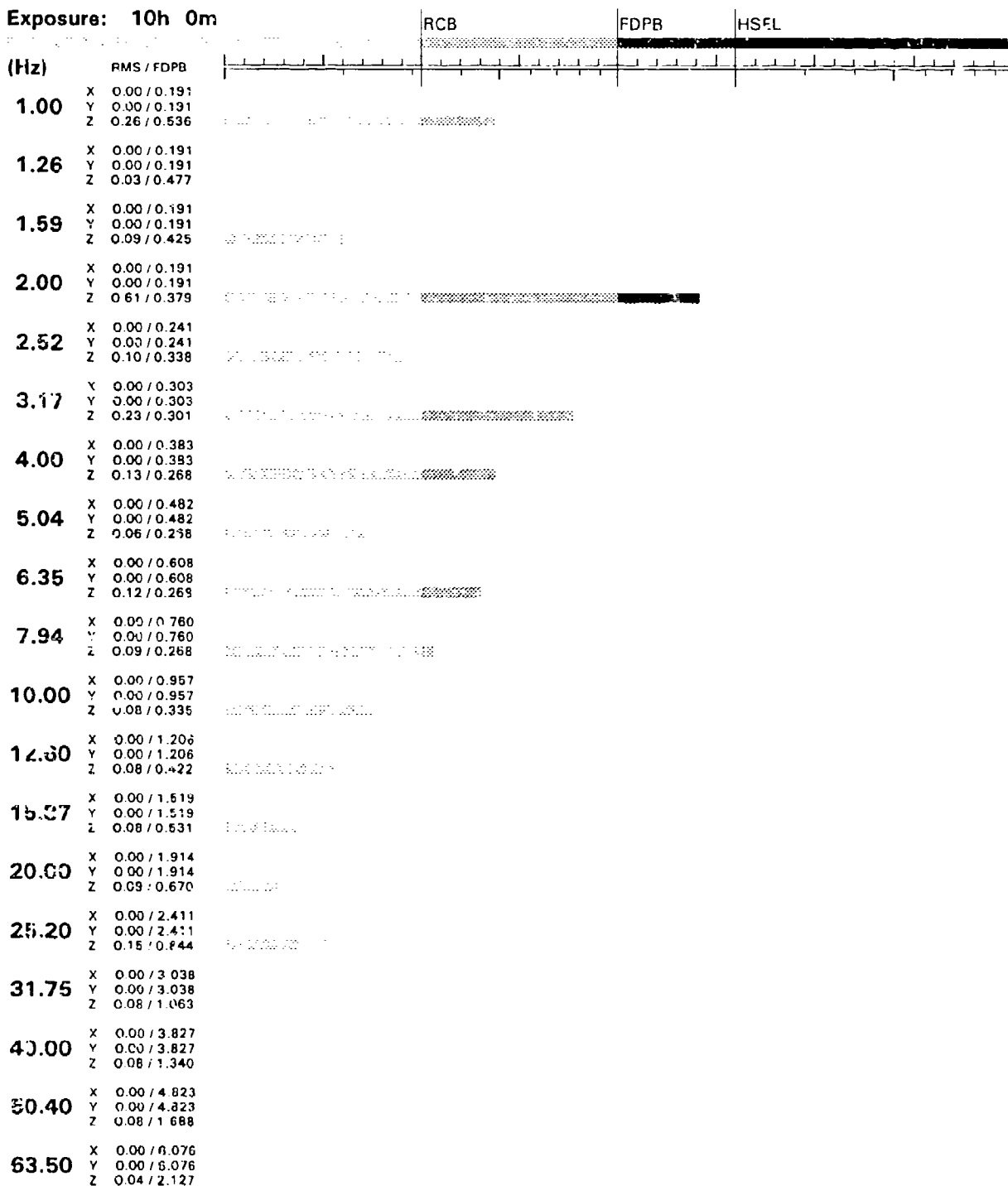
HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

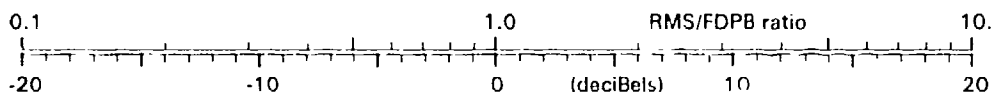
RUN-02
May 19, 1992

P-seat
PLS truck

Exposure: 10h 0m



17-MAY-94 13:18:47



Course: #3 APG, 0-500 feet
 Speed: 5 mph
 Note: HHA of PLS truck, passenger (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-02 D-seat

17-MAY-94 13:18:47

Sensor.... D-seat
Course.... #3 APG, 0-500 feet
Speed..... 5 mph
Vehicle... PLS truck
Date..... May 19, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	0.6700	0.4738	0:36	4:31	11:42
3.17	0.1800	0.1602	4:05	19:15	43:17
4.00	0.1400	0.1400	5:00	22:40	50:21
1.00	0.2700	0.1350	5:16	23:40	52:30
7.94	0.1200	0.1200	6:13	27:15	59:45

- * International Standards Organization ISO 2631:
- Comfort ... Reduced comfort boundary
 - Fatigue ... Fatigue-decreased proficiency boundary
 - Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-02

May 19, 1992

D-seat

PLS truck

Exposure: 10h 0m

(Hz)

RMS / FDPB

1.00 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.27 / 0.536

1.26 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.03 / 0.477

1.59 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.10 / 0.425

2.00 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.67 / 0.379

2.52 X 0.00 / 0.241
 Y 0.00 / 0.241
 Z 0.09 / 0.338

3.17 X 0.00 / 0.303
 Y 0.00 / 0.303
 Z 0.18 / 0.301

4.00 X 0.00 / 0.383
 Y 0.00 / 0.383
 Z 0.14 / 0.288

5.04 X 0.09 / 0.432
 Y 0.00 / 0.482
 Z 0.10 / 0.268

6.35 X 0.00 / 0.608
 Y 0.00 / 0.608
 Z 0.12 / 0.268

7.94 X 0.00 / 0.760
 Y 0.00 / 0.760
 Z 0.12 / 0.268

10.00 X 0.00 / 0.957
 Y 0.00 / 0.957
 Z 0.09 / 0.335

12.60 X 0.00 / 1.206
 Y 0.00 / 1.206
 Z 0.07 / 0.422

15.87 X 0.00 / 1.519
 Y 0.00 / 1.519
 Z 0.10 / 0.531

20.00 X 0.00 / 1.914
 Y 0.00 / 1.914
 Z 0.08 / 0.670

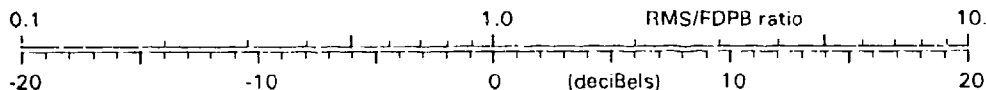
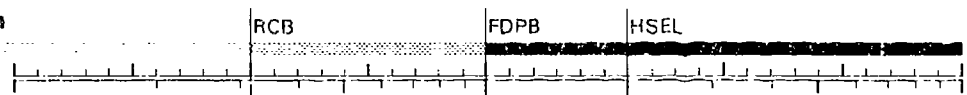
25.20 X 0.00 / 2.411
 Y 0.00 / 2.411
 Z 0.16 / 0.844

31.75 X 0.00 / 3.038
 Y 0.00 / 3.038
 Z 0.08 / 1.063

40.00 X 0.00 / 3.827
 Y 0.00 / 3.827
 Z 0.07 / 1.340

50.40 X 0.00 / 4.823
 Y 0.00 / 4.823
 Z 0.08 / 1.688

63.50 X 0.00 / 6.076
 Y 0.00 / 6.076
 Z 0.04 / 2.127



17-MAY-94 13:18:47

Course: #3 APG, 0-500 feet

Speed: 5 mph

Note: HHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-03 P-SEAT

17-MAY-94 13:18:47

Sensor.... P-SEAT
Course.... #3 APG
Speed..... 10 mph
Vehicle... PLS truck
Date..... May 19, 1992
Note..... HHA of PLS truck, passenger

Third-octave bands with greater
weighted RMS accelerations (m/s

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	0.5900	0.4172	0:47	5:26	13:48
1.00	0.5100	0.2550	2:00	10:41	25:17
4.00	0.2500	0.2500	2:03	10:57	25:52
3.17	0.2300	0.2048	2:49	14:11	32:45
6.35	0.1900	0.1900	3:11	15:34	35:41

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

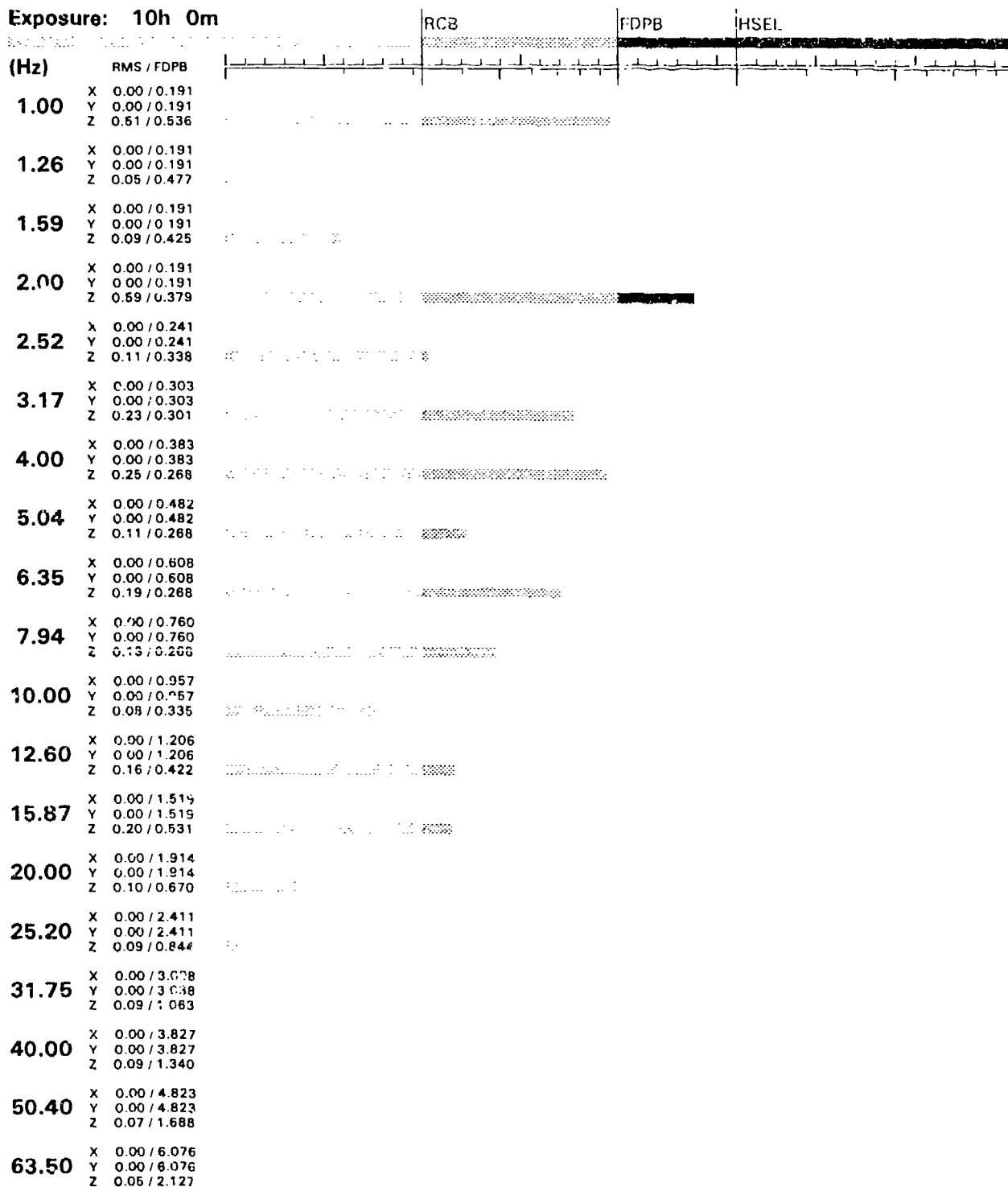
RUN-03

May 19, 1992

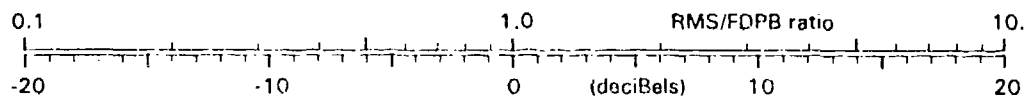
P-SEAT

PLS truck

Exposure: 10h 0m



17-MAY-94 13:18:47



Course: #3 APG
 Speed: 10 mph
 Note: HHA of PLS truck, passenger

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-03 D-SEAT

17-MAY-94 13:10:47

Sensor.... D-SEAT
Course.... #3 APG
Speed..... 10 mph
Vehicle... PLS truck
Date..... May 19, 1992
Note..... HHA of PLS truck, driver

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	0.6200	0.4384	0:42	5:03	12:56
4.00	0.3400	0.3400	1:13	7:15	17:50
3.17	0.3600	0.3205	1:21	7:52	19:10
1.00	0.5600	0.2800	1:42	9:26	22:37
6.35	0.2300	0.2300	2:20	12:12	28:32

- * International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

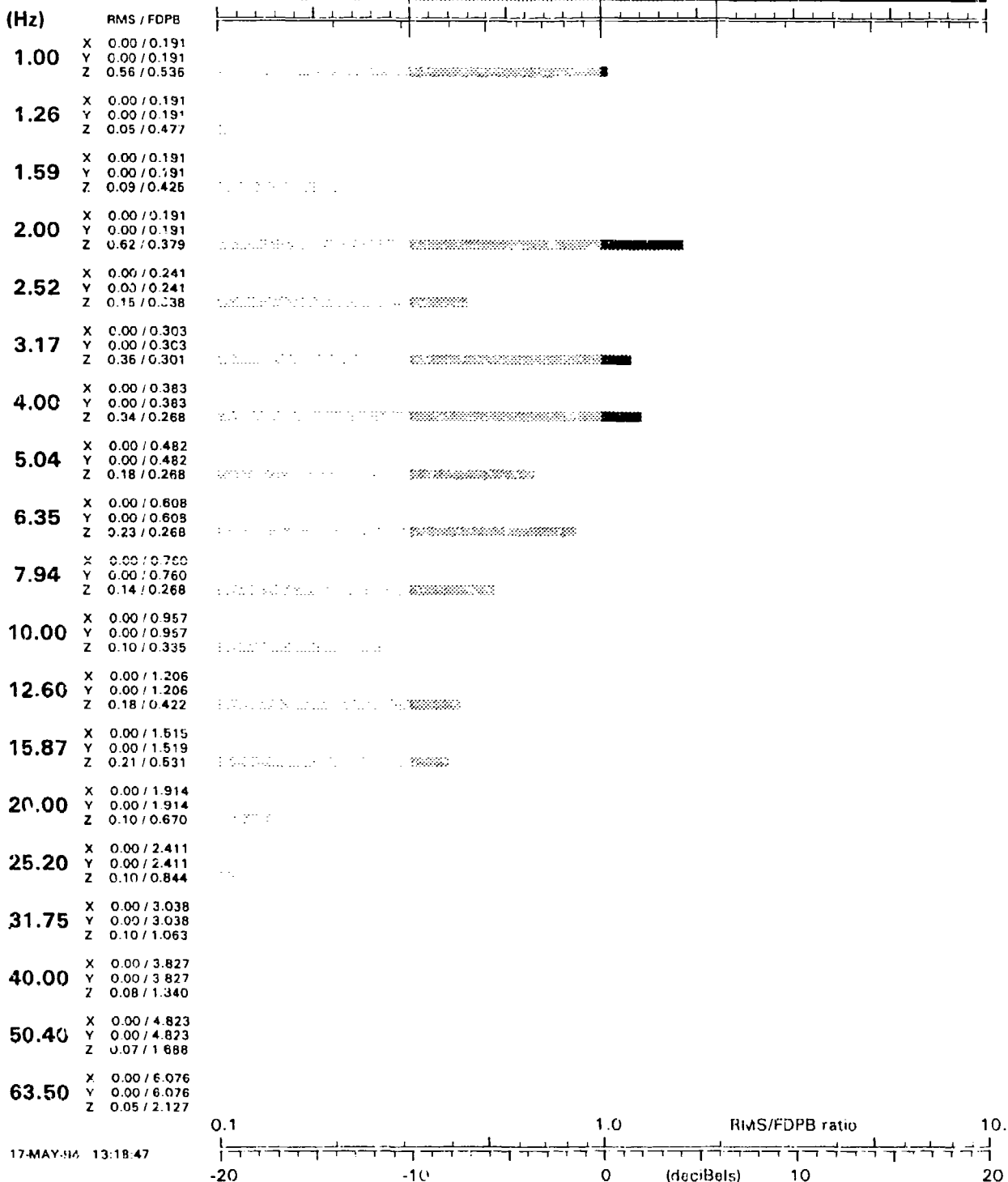
RUN-03

May 19, 1992

D-SEAT

PLS truck

Exposure: 10h 0m



Course: #3 APG
 Speed: 10 mph
 Note: HHA of PLS truck, driver

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-05 P-seat

17-MAY-94 13:18:48

Sensor.... P-seat
Course.... #3 APG
Speed..... 15 mph
Vehicle... PLS truck
Date..... May 19, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
4.00	0.5900	0.5900	0:20	3:15	8:45
2.00	0.7400	0.5233	0:30	3:55	10:18
3.17	0.4400	0.3917	0:53	5:56	14:56
1.00	0.7500	0.3750	0:59	6:20	15:48
5.04	0.3100	0.3100	1:25	8:12	20:00

* International Standards Organization ISO 2631

Comfort ... Reduced comfort boundary

Fatigue ... Fatigue-decreased proficiency boundary

Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

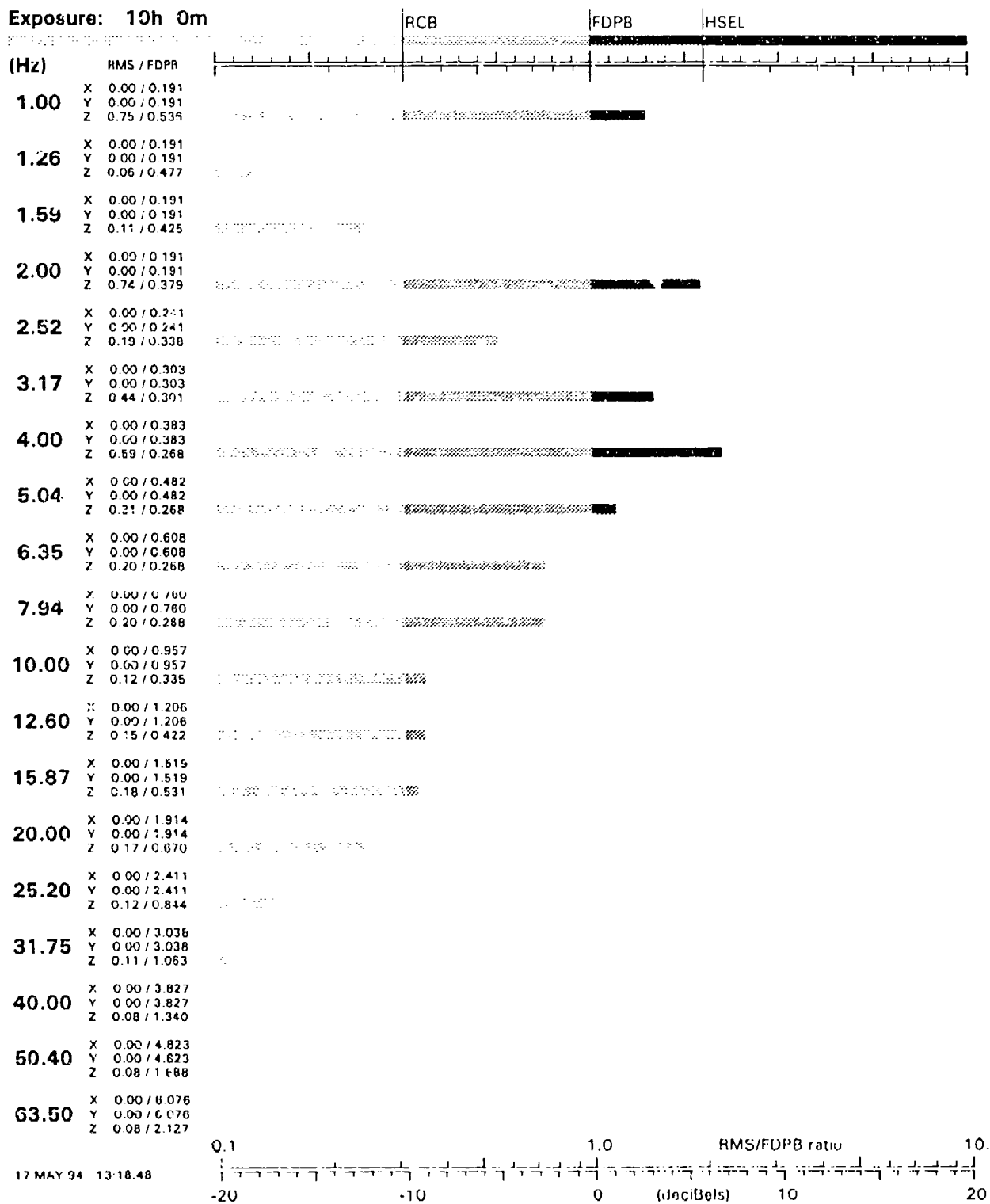
RUN-05

May 19, 1992

P-seat

PLS truck

Exposure: 10h 0m



Course: #3 APG
 Speed: 15 mph
 Note: HHA of PLS truck, passenger (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-05 D-seat

17-MAY-94 13:18:48

Sensor.... D-seat
Course.... #3 APG
Speed..... 15 mph
Vehicle... PLS truck
Date..... May 19, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
4.00	0.5000	0.5000	0:32	4:11	10:56
2.00	0.7000	0.4950	0:33	4:15	11:03
1.00	0.7300	0.3650	1:05	6:35	16:20
5.04	0.3000	0.3000	1:30	8:36	20:47
7.94	0.2000	0.2000	2:56	14:34	33:36

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary

Fatigue ... Fatigue-decreased proficiency boundary

Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-05

May 19, 1992

D-seat

PLS truck

Exposure: 10h 0m

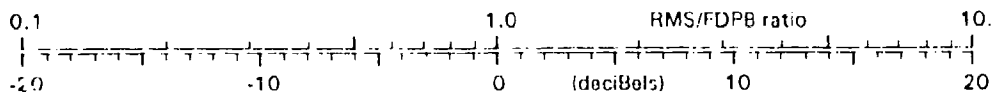
184800 184812

(Hz) RMS / FDPB

1.00	X 0.00 / 0.191 Y 0.00 / 0.191 Z 0.73 / 0.536
1.26	X 0.00 / 0.191 Y 0.00 / 0.191 Z 0.06 / 0.477
1.59	X 0.00 / 0.191 Y 0.00 / 0.191 Z 0.10 / 0.425
2.00	X 0.60 / 0.191 Y 0.00 / 0.191 Z 0.70 / 0.379
2.52	X 0.00 / 0.241 Y 0.00 / 0.241 Z 0.10 / 0.338
3.17	X 0.00 / 0.303 Y 0.00 / 0.303 Z 0.22 / 0.301
4.00	X 0.00 / 0.383 Y 0.00 / 0.383 Z 0.50 / 0.268
5.04	X 0.00 / 0.482 Y 0.00 / 0.482 Z 0.30 / 0.268
6.35	X 0.00 / 0.608 Y 0.00 / 0.608 Z 0.18 / 0.268
7.94	X 0.30 / 0.750 Y 0.00 / 0.760 Z 0.20 / 0.268
10.00	X 0.00 / 0.957 Y 0.00 / 0.957 Z 0.13 / 0.335
12.60	X 0.00 / 1.206 Y 0.00 / 1.206 Z 0.15 / 0.422
15.87	X 0.00 / 1.519 Y 0.00 / 1.519 Z 0.18 / 0.531
20.00	X 0.00 / 1.914 Y 0.00 / 1.914 Z 0.22 / 0.670
25.20	X 0.00 / 2.411 Y 0.00 / 2.411 Z 0.13 / 0.844
31.75	X 0.00 / 3.038 Y 0.00 / 3.038 Z 0.14 / 1.063
40.00	X 0.00 / 3.827 Y 0.00 / 3.827 Z 0.09 / 1.340
50.40	X 0.00 / 4.823 Y 0.00 / 4.823 Z 0.08 / 1.688
63.50	X 0.00 / 6.076 Y 0.00 / 6.076 Z 0.12 / 2.127



17-MAY-94 13 18.48



Course: #3 APG
 Speed: 15 mph
 Note: HHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-08 P-SEAT

17-MAY-94 13:18:50

Sensor.... P-SEAT
Course.... #3 APG
Speed..... 18 mph
Vehicle... PLS truck
Date..... May 19, 1992
Note..... HHA of PLS truck, passenger

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.9200	1.3576	0:01	0:44	2:36
4.00	1.1600	1.1600	0:01	1:04	3:19
3.17	0.8200	0.7300	0:13	2:20	6:33
5.04	0.6600	0.6600	0:16	2:45	7:31
6.35	0.5400	0.5400	0:30	3:44	9:52

* International Standards Organization ISO 2631

Comfort ... Reduced comfort boundary

Fatigue ... Fatigue-decreased proficiency boundary

Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

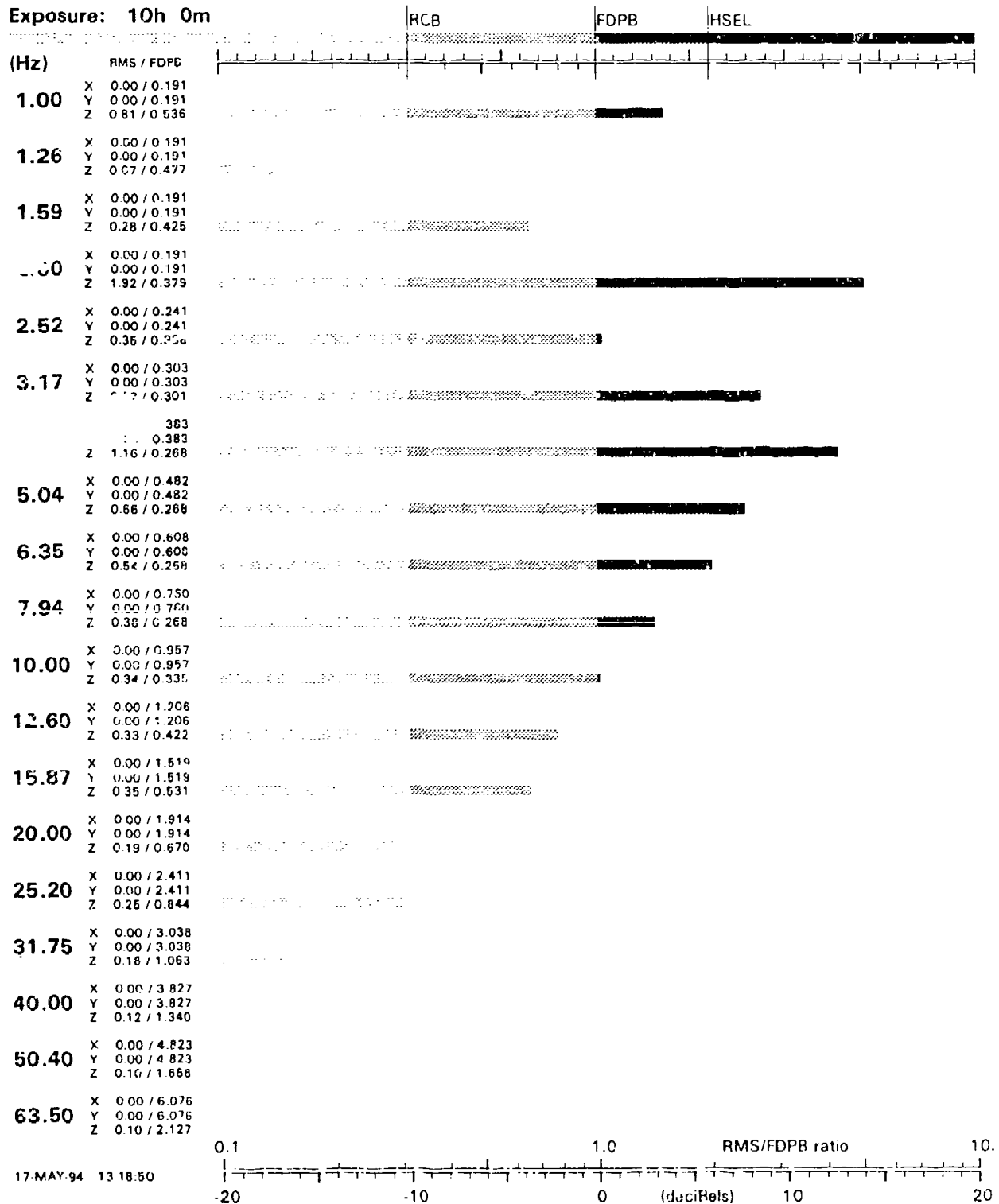
RUN-08

May 19, 1992

P-SEAT

PLS truck

Exposure: 10h 0m



Course: #3 APG
 Speed: 18 mph
 Note: HHA of PLS truck, passenger

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-08 D-seat

17-MAY-94 13:18:50

Sensor.... D-seat
Course.... #3 APG
Speed..... 18 mph
Vehicle... PLS truck
Date..... May 19, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
4.00	1.4800	1.4800	0:01	0:37	2:16
2.00	2.0100	1.4213	0:01	0:40	2:26
3.17	0.9700	0.8635	0:11	1:46	5:09
6.35	0.6200	0.6200	0:18	3:01	8:11
5.04	0.6200	0.6200	0:18	3:01	8:11

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

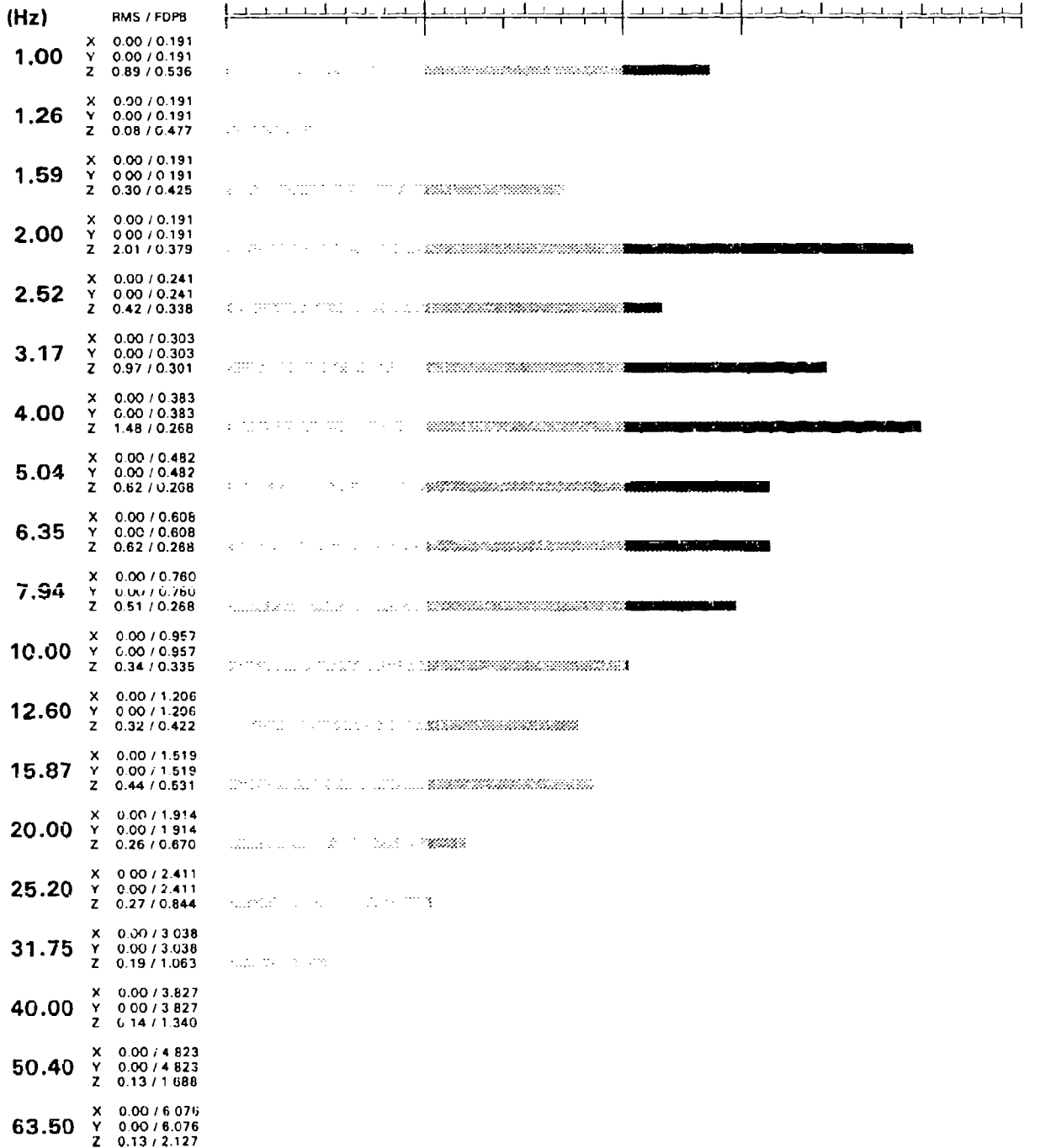
RUN-08

May 19, 1992

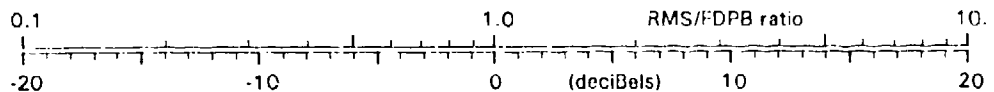
D-seat

PLS truck

Exposure: 10h 0m



17 MAY 94 13:18:50



Course: #3 APG
 Speed: 18 mph
 Note: HHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-10 P-seat

17-MAY-94 13:18:51

Sensor.... P-seat
Course.... #3 APG
Speed..... 20 mph
Vehicle... PLS truck
Date..... May 19, 1992
Note..... NHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	2.4400	1.7253	0:01	0:28	1:46
1.00	2.1300	1.0650	0:01	1:15	3:47
4.00	0.7400	0.7400	0:13	2:16	6:26
6.35	0.6200	0.6200	0:18	3:01	8:11
3.17	0.5600	0.4985	0:32	4:11	10:57

- * International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

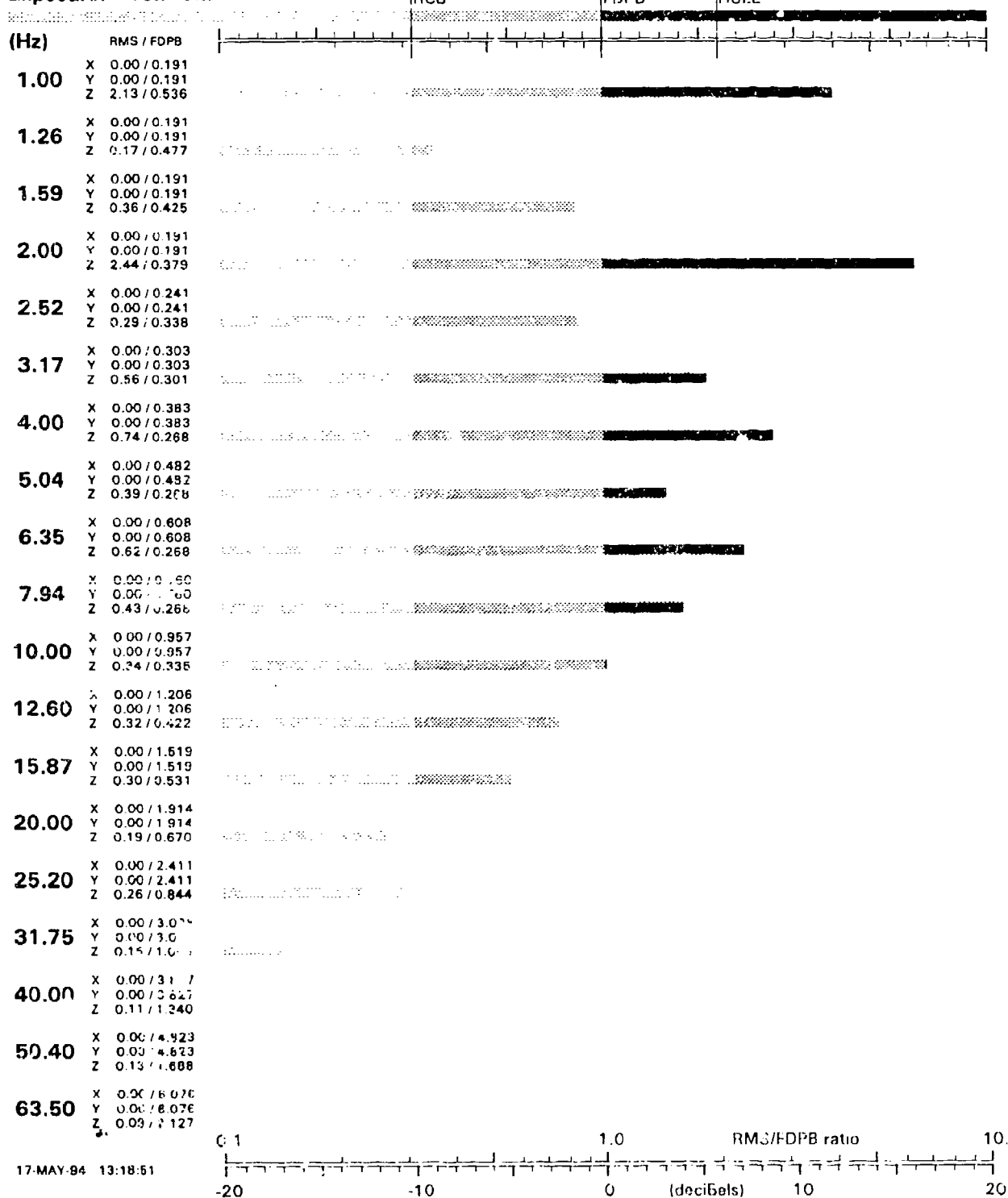
HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-10
May 19, 1992

P-seat
PLS truck

Exposure: 10h 0m



Course: #3 APG
 Speed: 20 mph
 Note: HHA of PLS truck, passenger (seat.)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WPV)

RUN-10 D-seat

17-MAY-94 13:18:51

Sensor.... D-seat
Course.... #3 APG
Speed..... 20 mph
Vehicle... PLS truck
Date..... May 19, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	2.3100	1.6334	0:01	0:30	1:57
1.00	2.3200	1.1600	0:01	1:04	3:19
4.00	0.8100	0.8100	0:11	1:59	5:39
5.04	0.7800	0.7800	0:12	2:05	5:58
7.94	0.6400	0.6400	0:16	2:53	7:50

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary

Fatigue ... Fatigue-decreased proficiency boundary

Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

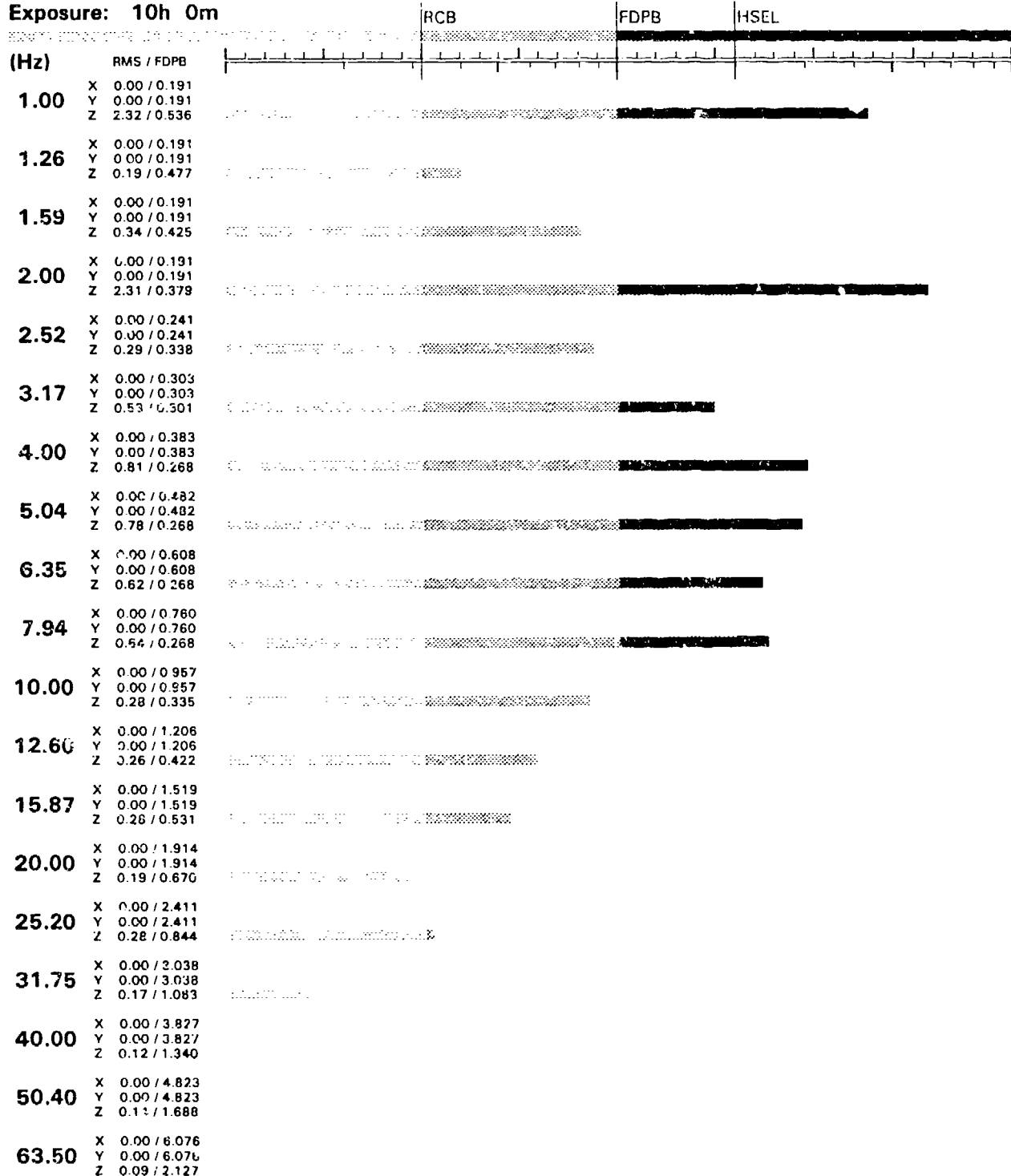
RUN-10

May 19, 1992

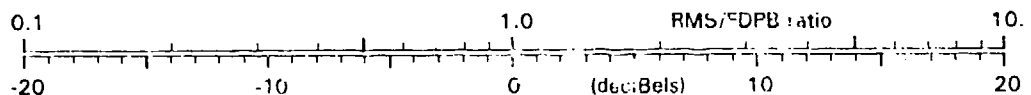
D-seat

PLS truck

Exposure: 10h 0m



17-MAY-94 13:18:51



Course: #3 APG
 Speed: 20 mph
 Note: HHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-15 P seat

17-MAY-94 13:18:53

Sensor.... P-seat
Course.... #2 APG
Speed..... 10 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.2400	0.8768	0:11	1:44	5:03
3.17	0.8000	0.7122	0:14	2:26	6:46
4.00	0.6400	0.6400	0:16	2:53	7:50
6.35	0.4400	0.4400	0:41	5:03	12:53
1.00	0.8100	0.4050	0:49	5:41	14:19

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

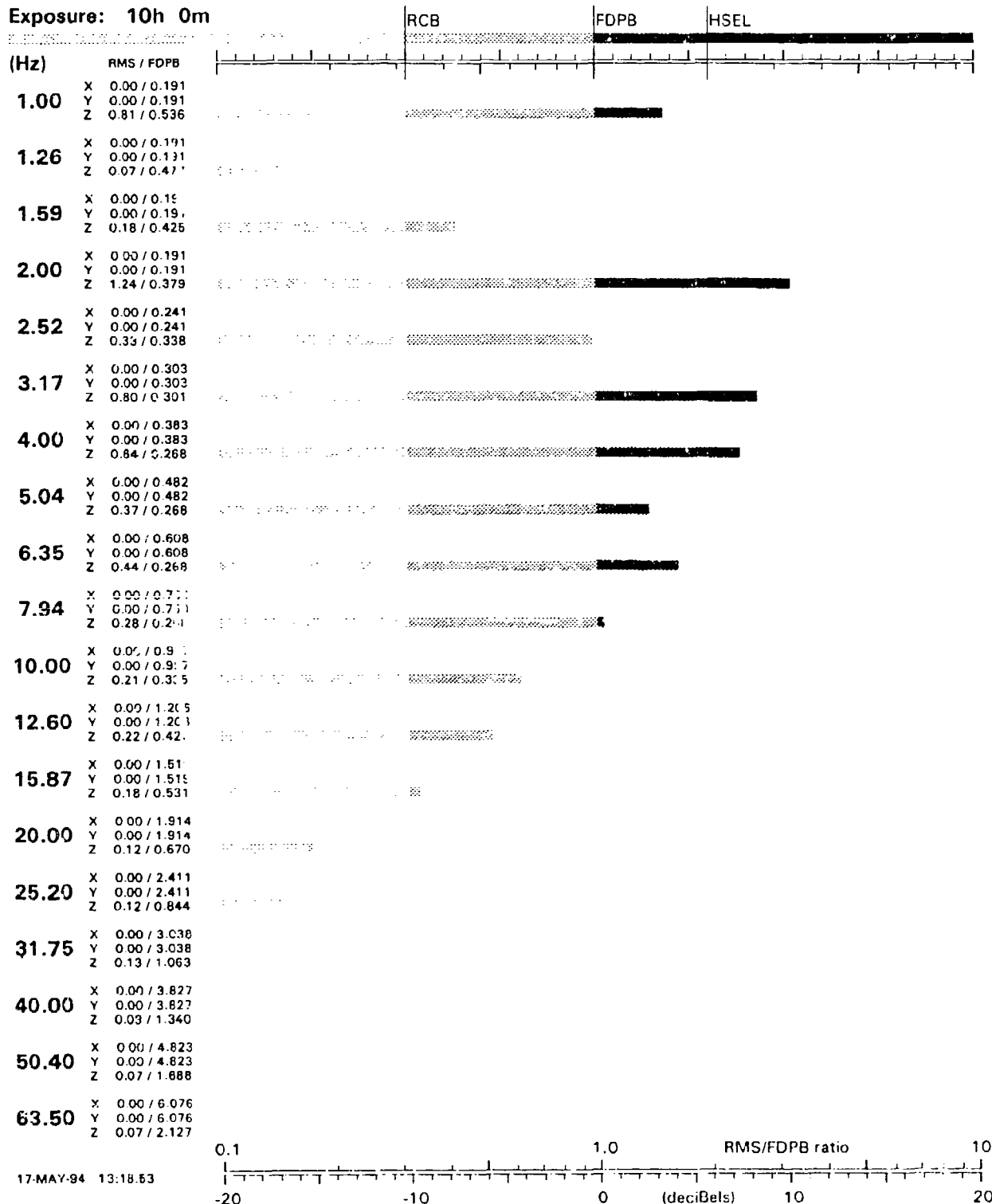
RUN-15

May 20, 1992

P-seat

PLS truck

Exposure: 10h 0m



Course: #2 APG
 Speed: 10 mph
 Note: HHA of PLS truck, passenger (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-15 D-seat

17-MAY-94 13:18:53

Sensor.... D-seat
Course.... #2 APG
Speed..... 10 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.1600	0.8202	0:11	1:55	5:33
4.00	0.4700	0.4700	0:37	4:35	11:49
1.00	0.8800	0.4400	0:41	5:03	12:53
3.17	0.4900	0.4362	0:42	5:07	13:00
6.35	0.4200	0.4200	0:47	5:24	13:41

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-15
 May 20, 1992

D-seat
 PLS truck

Exposure: 10h 0m

(Hz)

RMS / FDPB

1.00 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.88 / 0.536

1.26 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.07 / 0.477

1.59 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.17 / 0.425

2.00 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 1.16 / 0.379

2.52 X 0.00 / 0.241
 Y 0.00 / 0.241
 Z 0.22 / 0.338

3.17 X 0.00 / 0.303
 Y 0.00 / 0.303
 Z 0.49 / 0.301

4.00 X 0.00 / 0.383
 Y 0.00 / 0.383
 Z 0.47 / 0.268

5.04 X 0.00 / 0.482
 Y 0.00 / 0.482
 Z 0.39 / 0.268

6.35 X 0.00 / 0.608
 Y 0.00 / 0.608
 Z 0.42 / 0.268

7.94 X 0.00 / 0.760
 Y 0.00 / 0.760
 Z 0.31 / 0.268

10.00 X 0.00 / 0.957
 Y 0.00 / 0.957
 Z 0.19 / 0.335

12.60 X 0.00 / 1.206
 Y 0.00 / 1.206
 Z 0.20 / 0.422

15.87 X 0.00 / 1.519
 Y 0.00 / 1.519
 Z 0.24 / 0.531

20.00 X 0.00 / 1.914
 Y 0.00 / 1.914
 Z 0.14 / 0.6

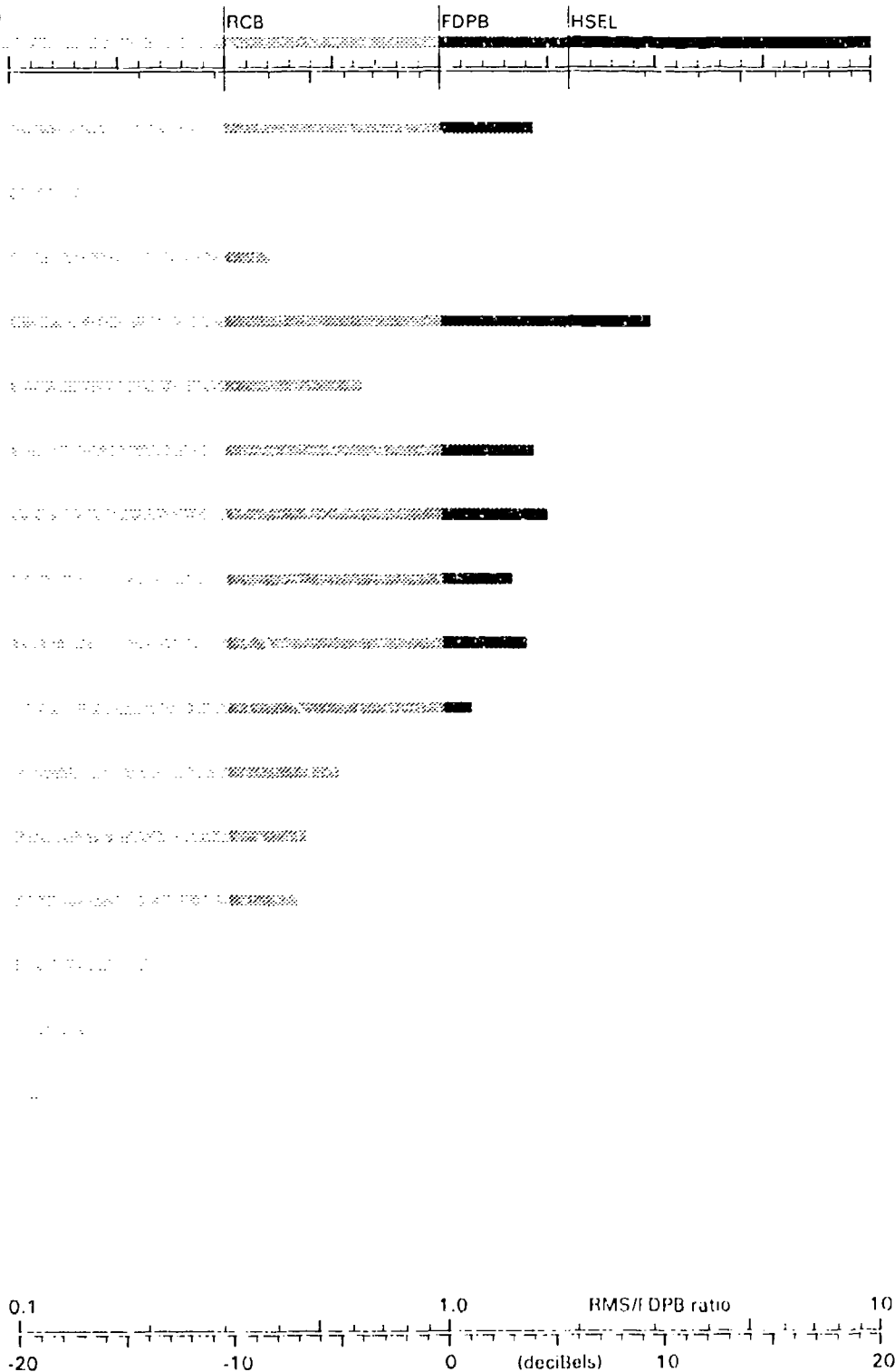
25.20 X 0.00 / 2.411
 Y 0.00 / 2.411
 Z 0.13 / 0.844

31.75 X 0.00 / 3.038
 Y 0.00 / 3.038
 Z 0.13 / 1.063

40.00 X 0.00 / 3.827
 Y 0.00 / 3.827
 Z 0.09 / 1.340

50.40 X 0.00 / 4.823
 Y 0.00 / 4.823
 Z 0.07 / 1.698

63.50 X 0.00 / 6.076
 Y 0.00 / 6.076
 Z 0.07 / 2.127



17 MAY-94 13:18:53

Course: #2 APG
 Speed: 10 mph
 Note: HHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-17 P-seat

17-MAY-94 13:18:54

Sensor.... P-seat
Course.... #2 APG
Speed..... 13 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.5000	1.0607	0:01	1:15	3:48
3.17	0.9600	0.8546	0:11	1:49	5:15
4.00	0.6600	0.6600	0:10	2:45	7:31
1.00	0.9700	0.4850	0:33	4:22	11:22
6.35	0.4400	0.4400	0:41	5:03	12:53

- * International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

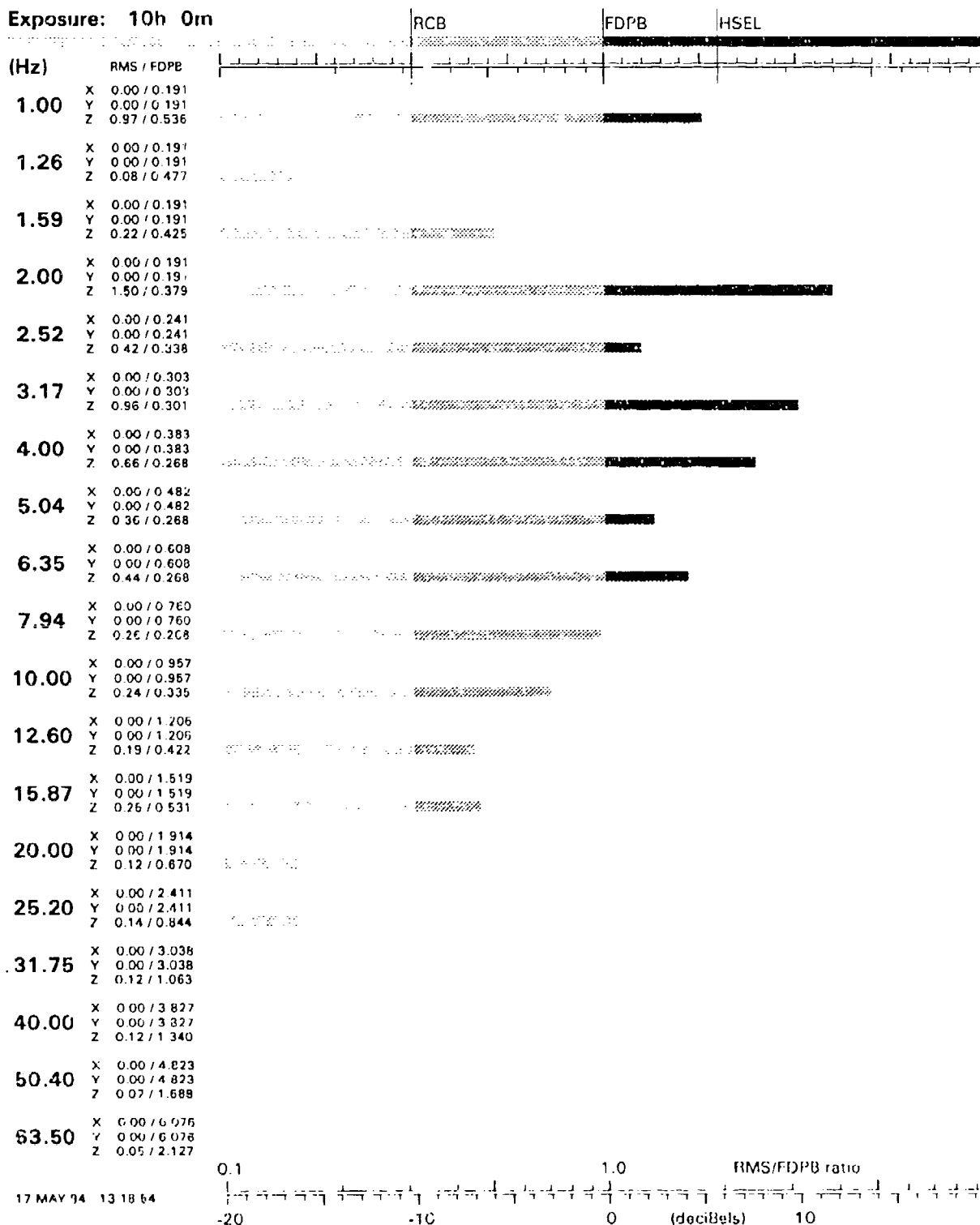
RUN-17

May 20, 1992

P-seat

PLS truck

Exposure: 10h 0m



Course: #2 APG
 Speed: 13 mph
 Note: HMA of PLS truck, passenger (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-17 D-seat

17-MAY-94 13:18:54

Sensor.... D-seat
Course.... #2 APG
Speed..... 13 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s^2)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.4600	1.0324	0:01	1:19	3:59
4.00	0.5900	0.5900	0:20	3:15	8:45
1.00	1.1600	0.5800	0:22	3:20	8:57
3.17	0.6000	0.5341	0:30	3:47	10:00
6.35	0.3700	0.3700	1:02	6:26	16:02

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

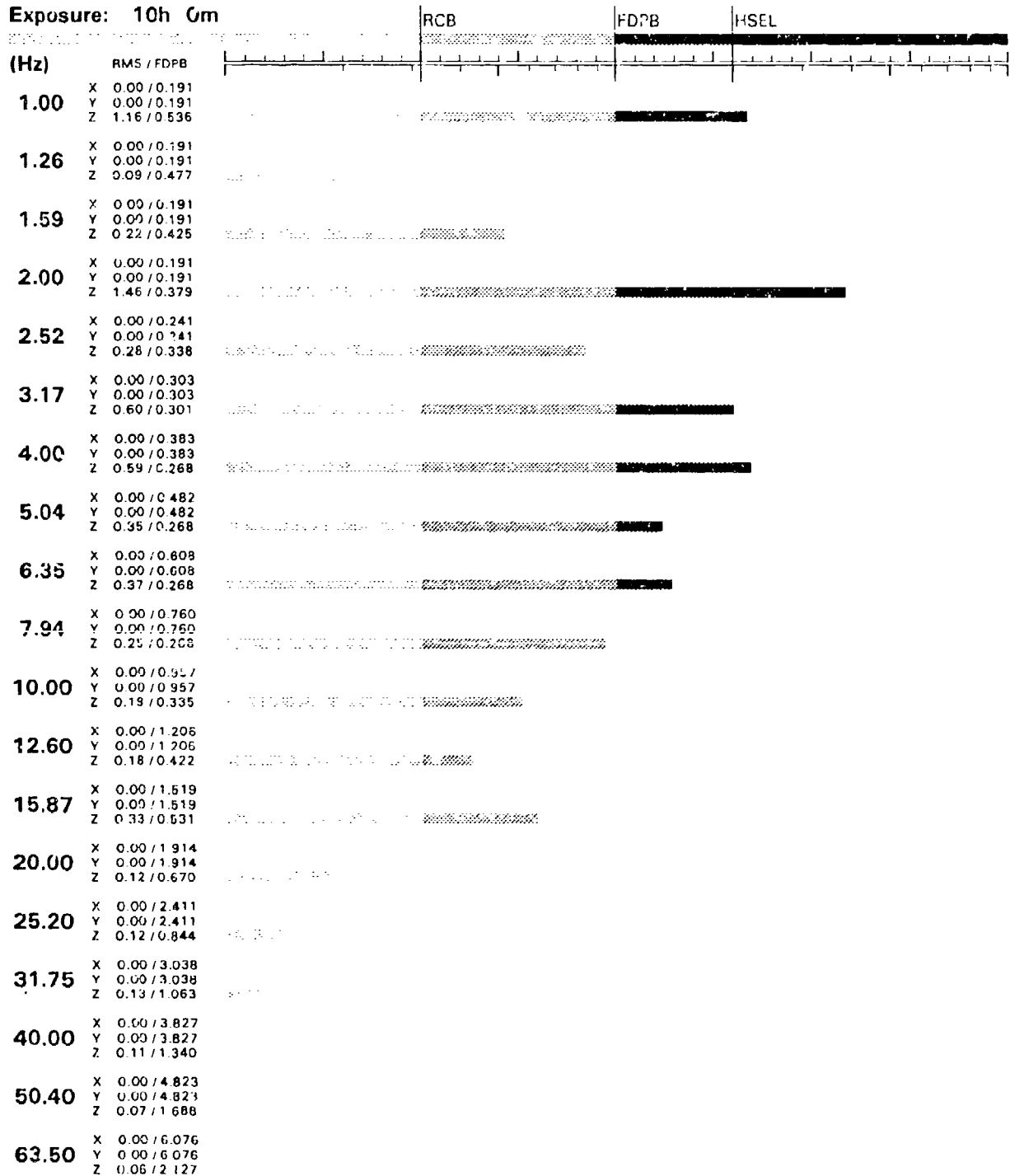
RUN-17

May 20, 1992

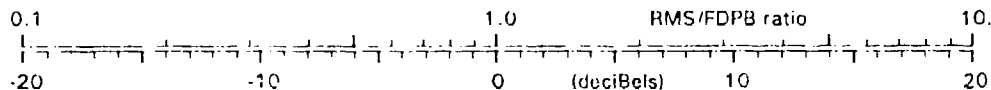
D-seat

PLS truck

Exposure: 10h 0m



17-MAY 94 13.18.54



Course: #2 APG
 Speed: 13 mph
 Note: HHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-20 P-seat

17 MAY 94 13:18:56

Sensor.... P-seat
Course.... #1 APG
Speed..... 5 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	0.6500	0.4596	0:38	4:43	12:11
1.00	0.3400	0.1700	3:45	17:52	40:30
3.17	0.1500	0.1335	5:20	24:00	53:06
7.94	0.1100	0.1100	7:01	30:10	65:37
6.35	0.1000	0.1000	8:00	33:45	72:45

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-20
May 20, 1992

P-seat
PLS truck

Exposure: 10h 0m

(Hz) RMS / FDPB

1.00 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.34 / 0.536

1.26 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.03 / 0.477

1.59 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.10 / 0.425

2.00 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.65 / 0.379

2.52 X 0.00 / 0.241
 Y 0.00 / 0.241
 Z 0.08 / 0.335

3.17 X 0.00 / 0.303
 Y 0.00 / 0.303
 Z 0.15 / 0.301

4.00 X 0.00 / 0.383
 Y 0.00 / 0.383
 Z 0.09 / 0.268

5.04 X 0.00 / 0.482
 Y 0.00 / 0.482
 Z 0.03 / 0.268

6.35 X 0.00 / 0.608
 Y 0.00 / 0.608
 Z 0.10 / 0.268

7.94 X 0.00 / 0.760
 Y 0.00 / 0.760
 Z 0.11 / 0.268

10.00 X 0.00 / 0.957
 Y 0.00 / 0.957
 Z 0.06 / 0.335

12.60 X 0.00 / 1.206
 Y 0.00 / 1.206
 Z 0.07 / 0.422

15.87 X 0.00 / 1.519
 Y 0.00 / 1.519
 Z 0.11 / 0.531

20.00 X 0.00 / 1.914
 Y 0.00 / 1.914
 Z 0.11 / 0.670

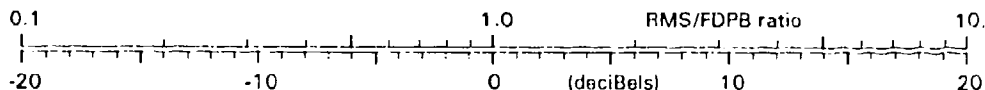
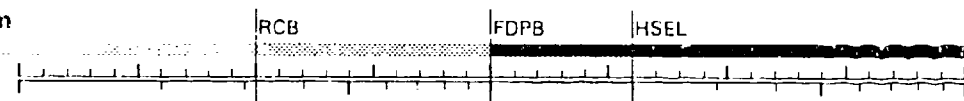
25.20 X 0.00 / 2.411
 Y 0.00 / 2.411
 Z 0.10 / 0.844

31.75 X 0.00 / 3.038
 Y 0.00 / 3.038
 Z 0.07 / 1.083

40.00 X 0.00 / 3.827
 Y 0.00 / 3.827
 Z 0.07 / 1.340

50.40 X 0.00 / 4.823
 Y 0.00 / 4.823
 Z 0.08 / 1.688

63.50 X 0.00 / 6.076
 Y 0.00 / 6.076
 Z 0.05 / 2.127



17 MAY 94 13:18:56

Course: #1 APG
 Speed: 5 mph
 Note: HHA of PLS truck, passenger (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-20 D-seat

17-MAY-94 13:18:56

Sensor.... D-seat
Course.... #1 APG
Speed..... 5 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	0.7100	0.5020	0:32	4:09	10:52
1.00	0.3300	0.1650	3:56	18:32	41:51
3.17	0.1700	0.1513	4:28	20:37	46:11
6.35	0.1200	0.1200	6:13	27:15	59:45
7.94	0.1100	0.1100	7:01	30:10	65:37

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-20
May 20, 1992

D-seat
PLS truck

Exposure: 10h 0m

(Hz)

RMS / FDPB
 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.33 / 0.536

1.00 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.03 / 0.477

1.26 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.11 / 0.425

1.59 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.71 / 0.379

2.00 X 0.00 / 0.241
 Y 0.00 / 0.241
 Z 0.09 / 0.338

2.52 X 0.00 / 0.303
 Y 0.00 / 0.303
 Z 0.17 / 0.301

3.17 X 0.00 / 0.383
 Y 0.00 / 0.383
 Z 0.10 / 0.268

4.00 X 0.00 / 0.482
 Y 0.00 / 0.482
 Z 0.09 / 0.268

5.04 X 0.00 / 0.608
 Y 0.00 / 0.608
 Z 0.12 / 0.268

6.35 X 0.00 / 0.760
 Y 0.00 / 0.760
 Z 0.11 / 0.268

7.94 X 0.00 / 0.957
 Y 0.00 / 0.957
 Z 0.08 / 0.335

10.00 X 0.00 / 1.206
 Y 0.00 / 1.206
 Z 0.06 / 0.422

12.60 X 0.00 / 1.519
 Y 0.00 / 1.519
 Z 0.11 / 0.531

15.87 X 0.00 / 1.914
 Y 0.00 / 1.914
 Z 0.13 / 0.670

20.00 X 0.00 / 2.411
 Y 0.00 / 2.411
 Z 0.11 / 0.844

25.20 X 0.00 / 3.038
 Y 0.00 / 3.038
 Z 0.07 / 1.083

31.75 X 0.00 / 3.827
 Y 0.00 / 3.827
 Z 0.07 / 1.340

40.00 X 0.00 / 4.823
 Y 0.00 / 4.823
 Z 0.07 / 1.698

50.40 X 0.00 / 6.076
 Y 0.00 / 6.076
 Z 0.04 / 2.127

17-MAY-94 13:18:56



Course: #1 APG
 Speed: 5 mph
 Note: HHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-22 P-seat

17-MAY-94 13:18:57

Sensor.... P-seat
Course.... #1 APG
Speed..... 10 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.3500	0.9546	0:01	1:30	4:28
3.17	0.5100	0.4540	0:40	4:48	12:22
1.00	0.7300	0.3650	1:05	6:35	16:20
4.00	0.3100	0.3100	1:25	8:12	20:00
6.35	0.2000	0.2000	2:56	14:34	33:36

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-22

May 20, 1992

P-seat

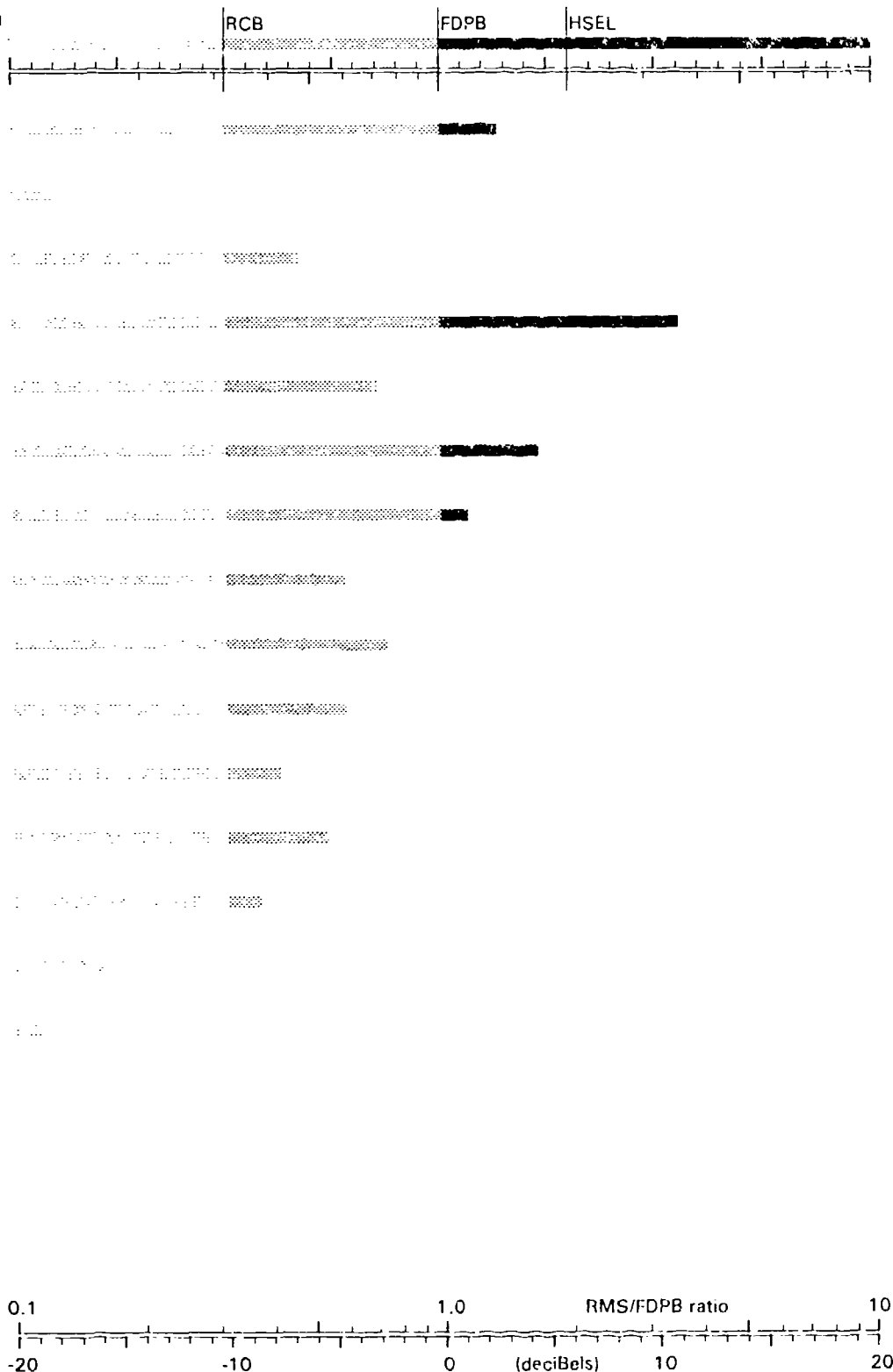
PLS truck

Exposure: 10h 0m

(Hz)

RMS / FDPB

1.00	X 0.00 / 0.191
	Y 0.00 / 0.191
	Z 0.73 / 0.536
1.26	X 0.00 / 0.191
	Y 0.00 / 0.191
	Z 0.00 / 0.477
1.59	X 0.00 / 0.191
	Y 0.00 / 0.191
	Z 0.20 / 0.425
2.00	X 0.00 / 0.191
	Y 0.00 / 0.191
	Z 1.35 / 0.379
2.52	X 0.00 / 0.241
	Y 0.00 / 0.241
	Z 0.24 / 0.338
3.17	X 0.00 / 0.303
	Y 0.00 / 0.303
	Z 0.51 / 0.301
4.00	X 0.00 / 0.383
	Y 0.00 / 0.383
	Z 0.31 / 0.268
5.04	X 0.00 / 0.482
	Y 0.00 / 0.482
	Z 0.16 / 0.268
6.35	X 0.00 / 0.608
	Y 0.00 / 0.608
	Z 0.20 / 0.268
7.94	X 0.00 / 0.760
	Y 0.00 / 0.760
	Z 0.16 / 0.268
10.00	X 0.00 / 0.957
	Y 0.00 / 0.957
	Z 0.14 / 0.335
12.60	X 0.00 / 1.206
	Y 0.00 / 1.206
	Z 0.23 / 0.422
15.87	X 0.00 / 1.519
	Y 0.00 / 1.519
	Z 0.20 / 0.531
20.00	X 0.00 / 1.914
	Y 0.00 / 1.914
	Z 0.11 / 0.670
25.20	X 0.00 / 2.411
	Y 0.00 / 2.411
	Z 0.10 / 0.844
31.75	X 0.00 / 3.038
	Y 0.00 / 3.038
	Z 0.10 / 1.063
40.00	X 0.00 / 3.827
	Y 0.00 / 3.827
	Z 0.10 / 1.340
50.40	X 0.00 / 4.823
	Y 0.00 / 4.823
	Z 0.06 / 1.688
63.50	X 0.00 / 6.076
	Y 0.00 / 6.076
	Z 0.05 / 2.127



Course: #1 APG
 Speed: 10 mph
 Note: HHA of PLS truck, passenger (seat)

USAAFL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-22 D-seat

17-MAY-94 13:18:57

Sensor.... D-seat
Course.... #1 APG
Speed..... 10 mph
Vehicle.... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.4200	1.0042	0:01	1:22	4:09
1.00	0.8400	0.4200	0:47	5:24	13:41
3.17	0.3700	0.3294	1:17	7:35	18:32
4.00	0.3000	0.3000	1:30	8:36	20:47
6.35	0.2000	0.2000	2:56	14:34	33:36

* International Standards Organization (ISO 2631)

Comfort ... Reduced comfort boundary

Fatigue ... Fatigue-decreased proficiency boundary

Health ... Health and safety exposure limit

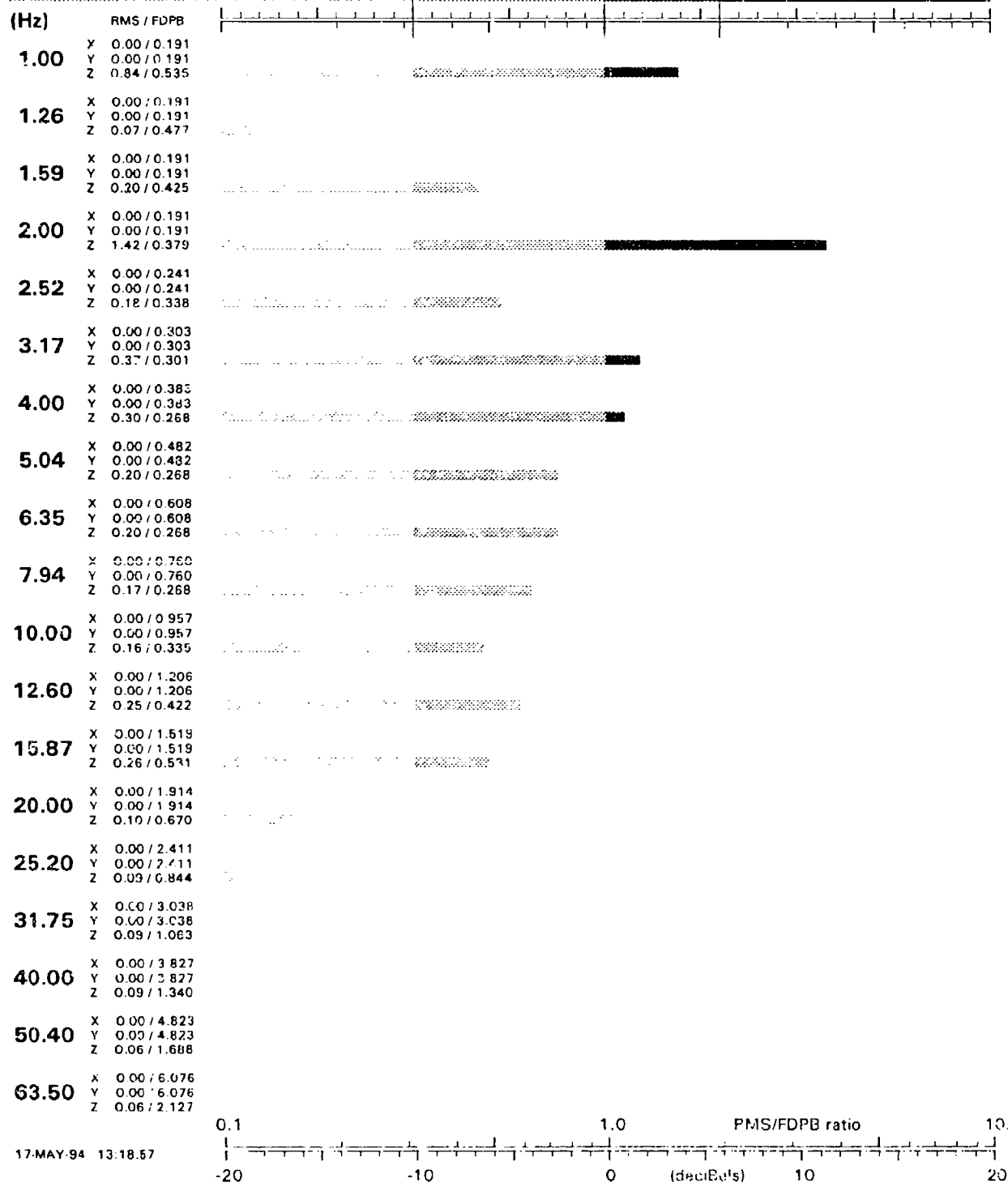
HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-22
May 20, 1992

D-seat
PLS truck

Exposure: 10h 0m



Course: #1 APG
 Speed: 10 mph
 Note: HHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-23 P-seat

17-MAY-94 13:18:57

Sensor.... P-seat
Course.... #1 APG
Speed..... 15 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	2.1300	1.5061	0:01	0:36	2:13
1.00	2.6800	1.3400	0:01	0:45	2:40
3.17	0.9100	0.8101	0:11	1:59	5:39
4.00	0.7400	0.7400	0:13	2:16	6:26
5.04	0.6100	0.6100	0:18	3:05	8:22

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-23

May 20, 1992

P-seat

PLS truck

Exposure: 10h 0m

(Hz)

RMS / FDPB

X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 2.68 / 0.536

X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.22 / 0.477

X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.32 / 0.425

X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 2.13 / 0.379

X 0.00 / 0.241
 Y 0.00 / 0.241
 Z 0.39 / 0.338

X 0.00 / 0.303
 Y 0.00 / 0.303
 Z 0.91 / 0.301

X 0.00 / 0.383
 Y 0.00 / 0.383
 Z 0.74 / 0.268

X 0.00 / 0.482
 Y 0.00 / 0.482
 Z 0.61 / 0.268

X 0.00 / 0.608
 Y 0.00 / 0.608
 Z 0.54 / 0.268

X 0.00 / 0.760
 Y 0.00 / 0.760
 Z 0.44 / 0.268

X 0.00 / 0.957
 Y 0.00 / 0.957
 Z 0.24 / 0.335

X 0.00 / 1.206
 Y 0.00 / 1.206
 Z 0.22 / 0.422

X 0.00 / 1.519
 Y 0.00 / 1.519
 Z 0.25 / 0.531

X 0.00 / 1.914
 Y 0.00 / 1.914
 Z 0.22 / 0.670

X 0.00 / 2.411
 Y 0.00 / 2.411
 Z 0.16 / 0.844

X 0.00 / 3.038
 Y 0.00 / 3.038
 Z 0.15 / 1.063

X 0.00 / 3.827
 Y 0.00 / 3.827
 Z 0.11 / 1.340

X 0.00 / 4.823
 Y 0.00 / 4.823
 Z 0.10 / 1.688

X 0.00 / 6.076
 Y 0.03 / 6.076
 Z 0.10 / 2.127



17 MAY 94 13:18 57

Course: #1 AFG
 Speed: 15 mph
 Note: HHA of PLS truck, passenger (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-23 D-seat

17-MAY-94 13:18:57

Sensor.... D-seat
Course.... #1 APG
Speed..... 15 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	2.1900	1.5486	0:01	0:33	2:06
1.00	2.6500	1.4250	0:01	0:40	2:26
3.17	0.8500	0.7567	0:12	2:13	6:13
4.00	0.6300	0.6300	0:18	2:57	8:00
5.04	0.4400	0.4400	0:41	5:03	12:53

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue damage proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration F.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

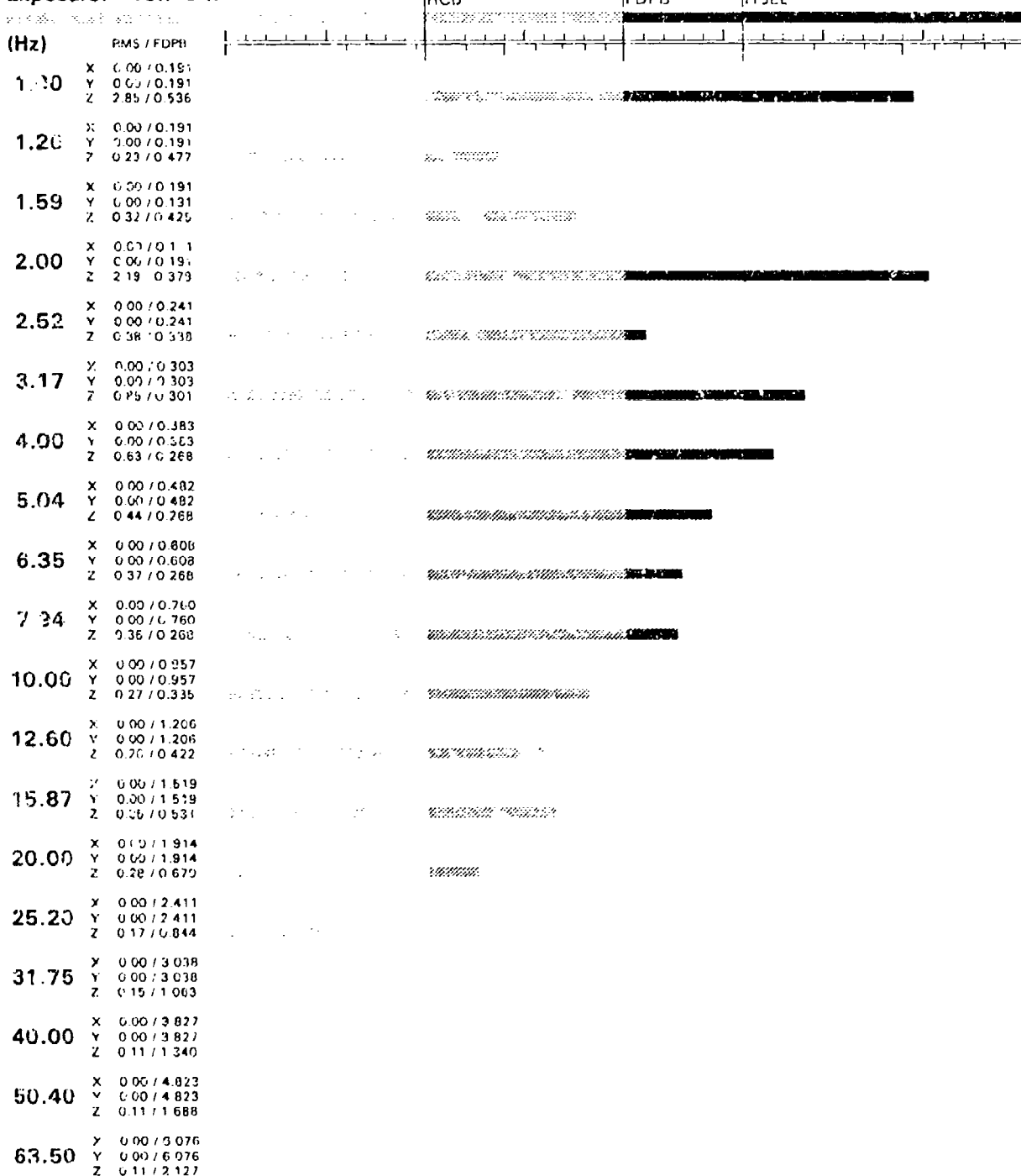
RUN-23

May 20, 1992

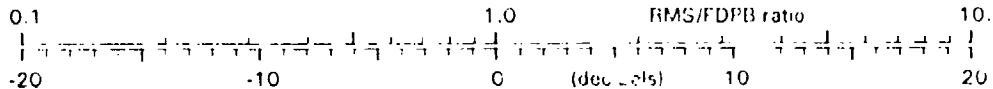
D-seat

PLS truck

Exposure: 10l. 0m



17 MAY 94 13:18:57



Course: #1 APG
 Speed: 15 mph
 Note: IHHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-26 P-seat

17-MAY-94 13:18:59

Sensor.... P-seat
Course.... #1 APG
Speed..... 13 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.0700	0.7566	0:12	2:13	6:13
3.17	0.7800	0.6944	0:14	2:31	7:01
1.00	1.3800	0.6900	0:15	2:33	7:05
4.00	0.4300	0.4300	0:44	5:13	13:15
2.52	0.3200	0.2540	2:00	10:42	25:25

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

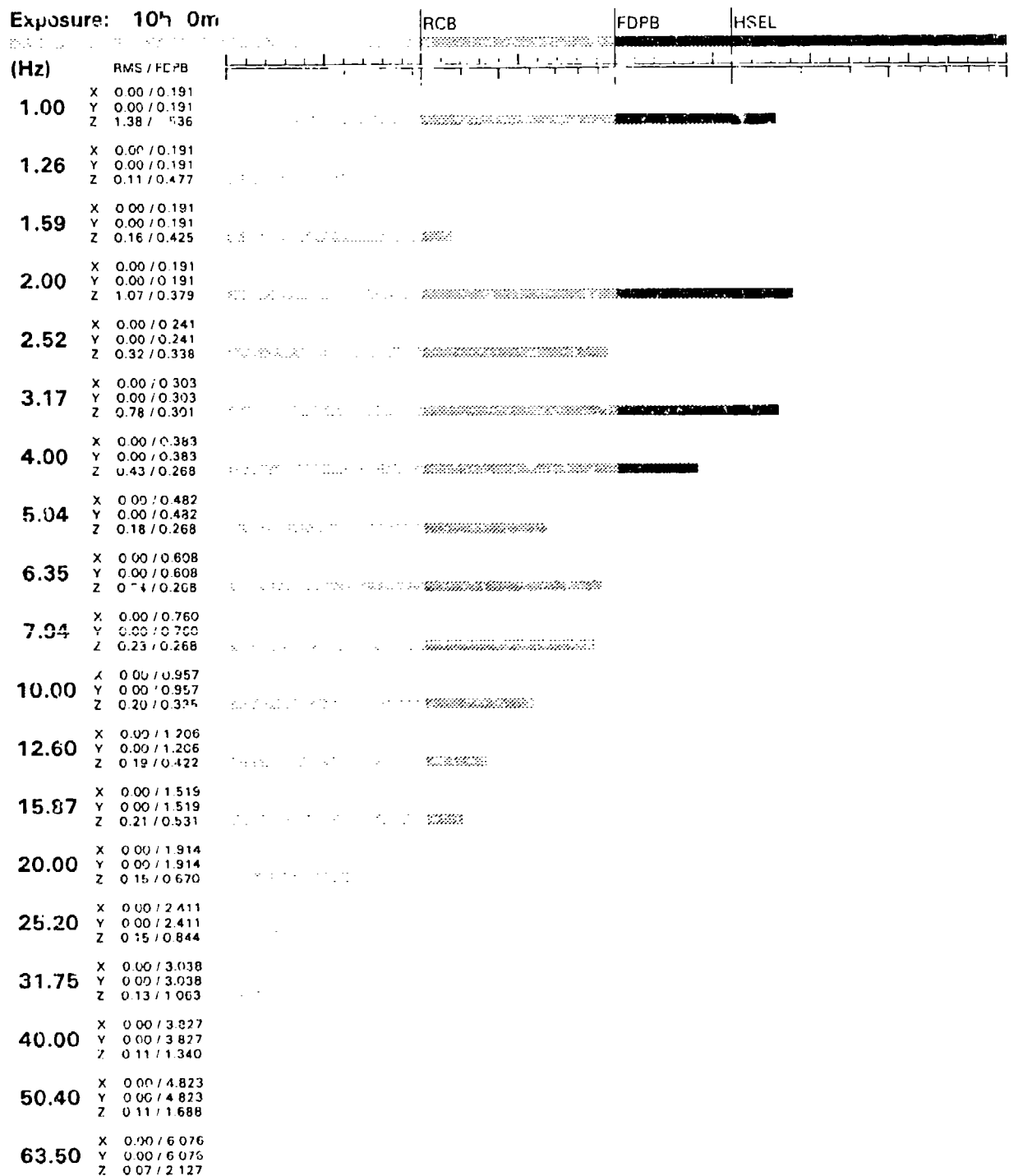
RUN-26

May 20, 1992

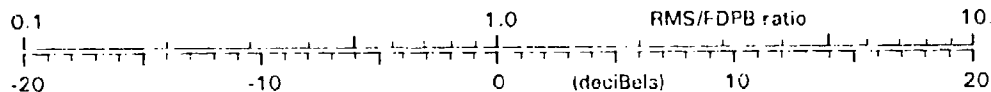
P-seat

PLS truck

Exposure: 10h 0m



17 MAY-94 13 18 59



Course: #1 APG
 Speed: 13 mph
 Note: HHA of PLS truck, passenger (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-26 D-seat

17-MAY-94 13:18:59

Sensor.... D-seat
Course.... #1 APG
Speed..... 13 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HPA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.1200	0.7920	0:11	2:02	5:50
1.00	1.4800	0.7400	0:13	2:16	6:26
3.17	0.7600	0.6766	0:15	2:39	7:16
4.00	0.4600	0.4600	0:37	4:43	12:11
6.35	0.3300	0.3300	1:16	7:33	18:30

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-26
May 20, 1992

D-seat
PLS truck

Exposure: 10h 0m

(Hz)

(Hz)	RMS / FDPB
1.00	X 0.00 / 0.191 Y 0.00 / 0.191 Z 1.48 / 0.536
1.26	X 0.00 / 0.191 Y 0.00 / 0.191 Z 0.12 / 0.477
1.59	X 0.00 / 0.191 Y 0.00 / 0.191 Z 0.16 / 0.425
2.00	X 0.00 / 0.191 Y 0.00 / 0.191 Z 1.12 / 0.379
2.52	X 0.00 / 0.241 Y 0.00 / 0.241 Z 0.31 / 0.338
3.17	X 0.00 / 0.303 Y 0.00 / 0.303 Z 0.76 / 0.301
4.00	X 0.00 / 0.383 Y 0.00 / 0.383 Z 0.46 / 0.268
5.04	X 0.00 / 0.482 Y 0.00 / 0.482 Z 0.20 / 0.268
6.35	X 0.00 / 0.608 Y 0.00 / 0.608 Z 0.33 / 0.268
7.94	X 0.00 / 0.760 Y 0.00 / 0.760 Z 0.18 / 0.268
10.00	X 0.00 / 0.957 Y 0.00 / 0.957 Z 0.19 / 0.335
12.60	X 0.00 / 1.206 Y 0.00 / 1.206 Z 0.19 / 0.422
15.87	X 0.00 / 1.519 Y 0.00 / 1.519 Z 0.34 / 0.531
20.00	X 0.00 / 1.914 Y 0.00 / 1.914 Z 0.16 / 0.670
25.20	X 0.00 / 2.411 Y 0.00 / 2.411 Z 0.16 / 0.844
31.75	X 0.00 / 3.038 Y 0.00 / 3.038 Z 0.12 / 1.063
40.00	X 0.00 / 3.827 Y 0.00 / 3.827 Z 0.11 / 1.340
50.40	X 0.00 / 4.823 Y 0.00 / 4.823 Z 0.11 / 1.688
63.50	X 0.00 / 6.076 Y 0.00 / 6.076 Z 0.07 / 2.127



17 MAY 94 13:18:59

Course: #1 APG
 Speed: 13 mph
 Note: HHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-27 P-seat

17-MAY-94 13:18:59

Sensor.... P-seat
Course.... #1 APG
Speed..... 14 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	2.0600	1.4566	0:01	0:37	2:20
3.17	0.8100	0.7211	0:13	2:23	6:39
4.00	0.6300	0.6300	0:18	2:57	8:00
1.00	1.2600	0.6300	0:18	2:57	8:00
6.35	0.4200	0.4200	0:47	5:24	13:41

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-27

May 20, 1992

P-seat

PLS truck

Exposure: 10h 0m

(Hz)

RMS / FDPB

1.00 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 1.26 / 0.536

1.26 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.11 / 0.477

1.59 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.31 / 0.425

2.00 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 2.06 / 0.379

2.52 X 0.00 / 0.241
 Y 0.00 / 0.241
 Z 0.37 / 0.338

3.17 X 0.00 / 0.303
 Y 0.00 / 0.303
 Z 0.81 / 0.301

4.00 X 0.00 / 0.383
 Y 0.00 / 0.383
 Z 0.63 / 0.268

5.04 X 0.00 / 0.482
 Y 0.00 / 0.482
 Z 0.39 / 0.268

6.35 X 0.00 / 0.608
 Y 0.00 / 0.608
 Z 0.42 / 0.268

7.94 X 0.00 / 0.760
 Y 0.00 / 0.760
 Z 0.34 / 0.268

10.00 X 0.00 / 0.957
 Y 0.00 / 0.957
 Z 0.26 / 0.335

12.80 X 0.00 / 1.206
 Y 0.00 / 1.206
 Z 0.26 / 0.422

15.87 X 0.00 / 1.519
 Y 0.00 / 1.519
 Z 0.27 / 0.531

20.00 X 0.00 / 1.914
 Y 0.00 / 1.914
 Z 0.22 / 0.570

25.20 X 0.00 / 2.411
 Y 0.00 / 2.411
 Z 0.19 / 0.844

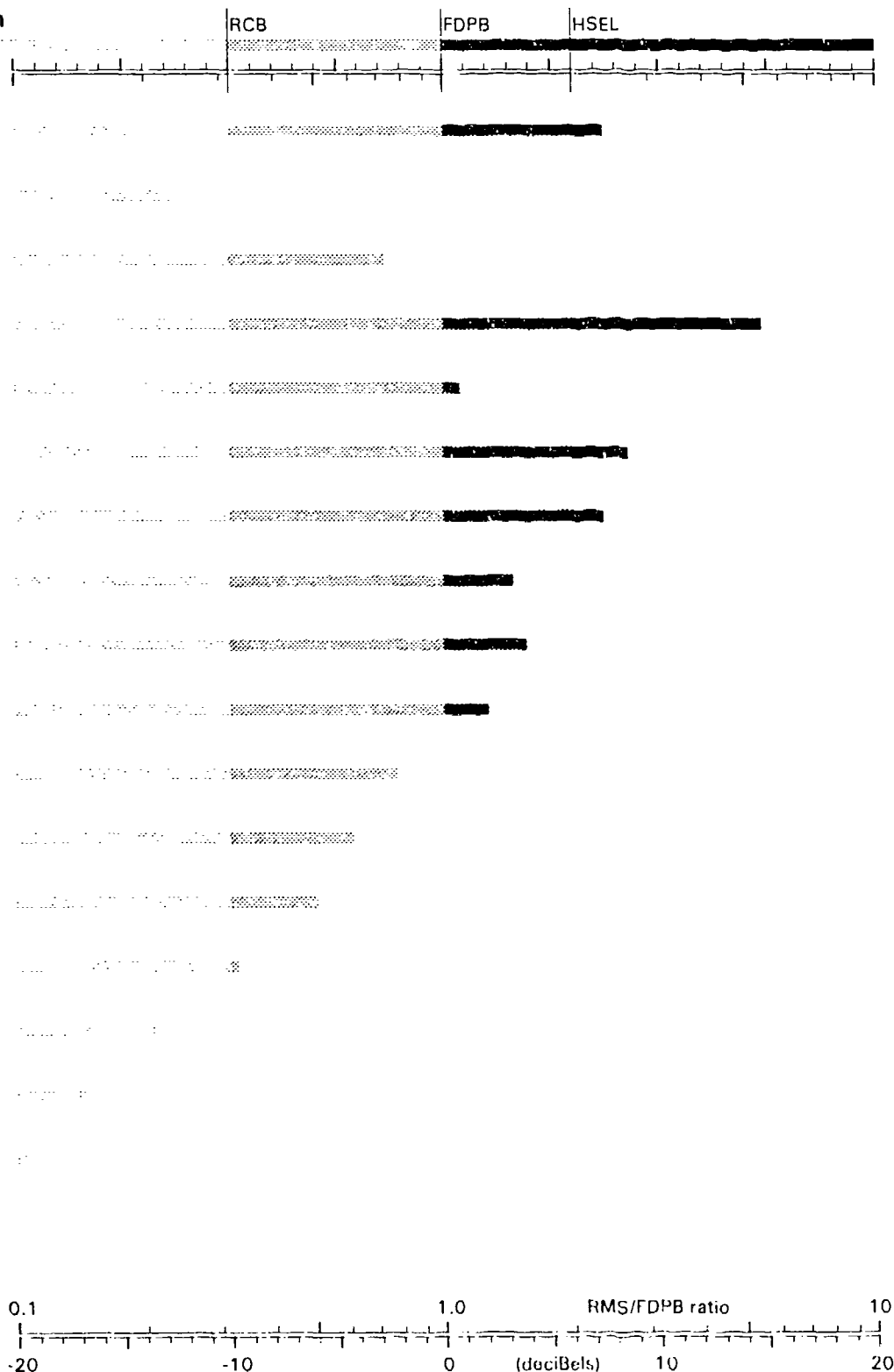
31.75 X 0.00 / 3.038
 Y 0.00 / 3.038
 Z 0.16 / 1.063

40.00 X 0.00 / 3.827
 Y 0.00 / 3.827
 Z 0.14 / 1.340

50.40 X 0.00 / 4.823
 Y 0.00 / 4.823
 Z 0.11 / 1.686

63.50 X 0.00 / 6.076
 Y 0.00 / 6.076
 Z 0.10 / 2.127

17-MAY-94 13:18:59



Course: #1 APC
 Speed: 14 mph
 Note: HHA of PLS truck, passenger (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-27 D-seat

17-MAY-94 13:18:59

Sensor.... D-seat
Course.... #1 APG
Speed..... 14 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	2.1600	1.5274	0:01	0:34	2:10
1.00	1.3000	0.6500	0:16	2:48	7:41
3.17	0.6900	0.6143	0:18	3:03	8:18
4.00	0.5900	0.5900	0:20	3:15	8:45
5.04	0.5100	0.5100	0:30	4:03	10:38

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-27

May 20, 1992

D-seat

PLS truck

Exposure: 10h 0m

(Hz)

RMS / FDPB
 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 1.30 / 0.536

1.00

1.26

1.59

2.00

2.52

3.17

4.00

5.04

6.35

7.94

10.00

12.60

15.87

20.00

25.20

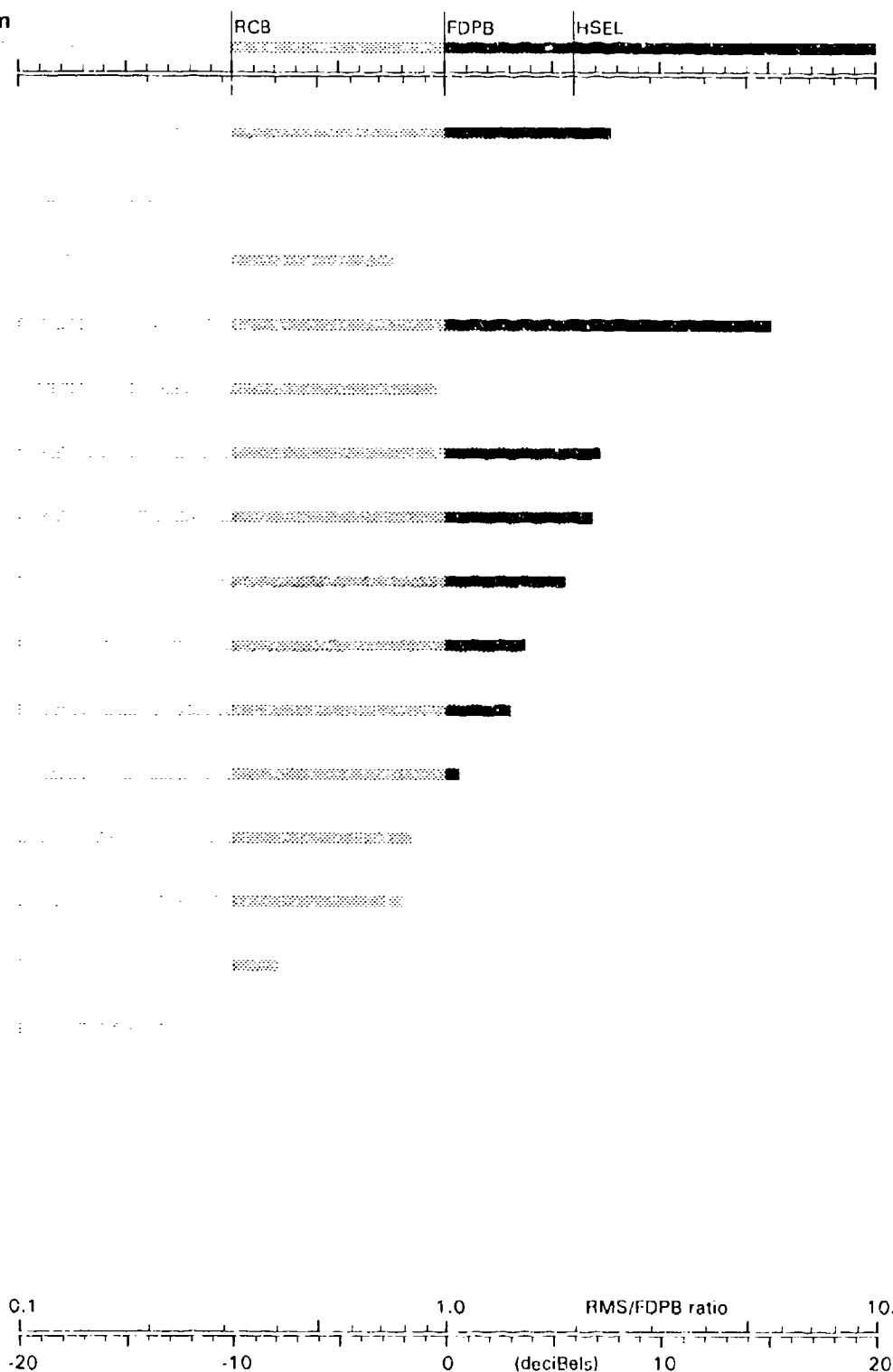
31.75

40.00

50.40

63.50

X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 1.30 / 0.536
 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.11 / 0.477
 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.32 / 0.425
 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 2.16 / 0.379
 X 0.00 / 0.241
 Y 0.00 / 0.241
 Z 0.32 / 0.338
 X 0.00 / 0.303
 Y 0.00 / 0.303
 Z 0.69 / 0.301
 X 0.00 / 0.383
 Y 0.00 / 0.383
 Z 0.59 / 0.268
 X 0.00 / 0.462
 Y 0.00 / 0.462
 Z 0.51 / 0.268
 X 0.00 / 0.608
 Y 0.00 / 0.608
 Z 0.41 / 0.268
 X 0.00 / 0.760
 Y 0.00 / 0.760
 Z 0.38 / 0.268
 X 0.00 / 0.957
 Y 0.00 / 0.957
 Z 0.36 / 0.335
 X 0.00 / 1.206
 Y 0.00 / 1.205
 Z 0.35 / 0.422
 X 0.00 / 1.519
 Y 0.00 / 1.519
 Z 0.42 / 0.531
 X 0.00 / 1.914
 Y 0.00 / 1.914
 Z 0.27 / 0.670
 X 0.00 / 2.411
 Y 0.00 / 2.411
 Z 0.20 / 0.844
 X 0.00 / 3.038
 Y 0.00 / 3.038
 Z 0.17 / 1.063
 X 0.00 / 3.827
 Y 0.00 / 3.827
 Z 0.15 / 1.340
 X 0.00 / 4.823
 Y 0.00 / 4.823
 Z 0.12 / 1.688
 X 0.00 / 6.076
 Y 0.00 / 6.076
 Z 0.11 / 2.127



17-MAY 94 13:10:59

Course: #1 APG
 Speed: 14 mph
 Note: HHA of PLS truck, driver (seat)

USAAKL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-33 P-seat

17-MAY-94 13:19:02

Sensor.... P-seat
Course.... #5 APG
Speed..... 5 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s^2)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.2400	0.8768	0:11	1:44	5:03
1.00	1.2400	0.6200	0:18	3:01	8:11
3.17	0.5400	0.4807	0:34	4:26	11:30
4.00	0.3500	0.3500	1:09	6:58	17:13
6.35	0.3300	0.3300	1:16	7:33	18:30

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

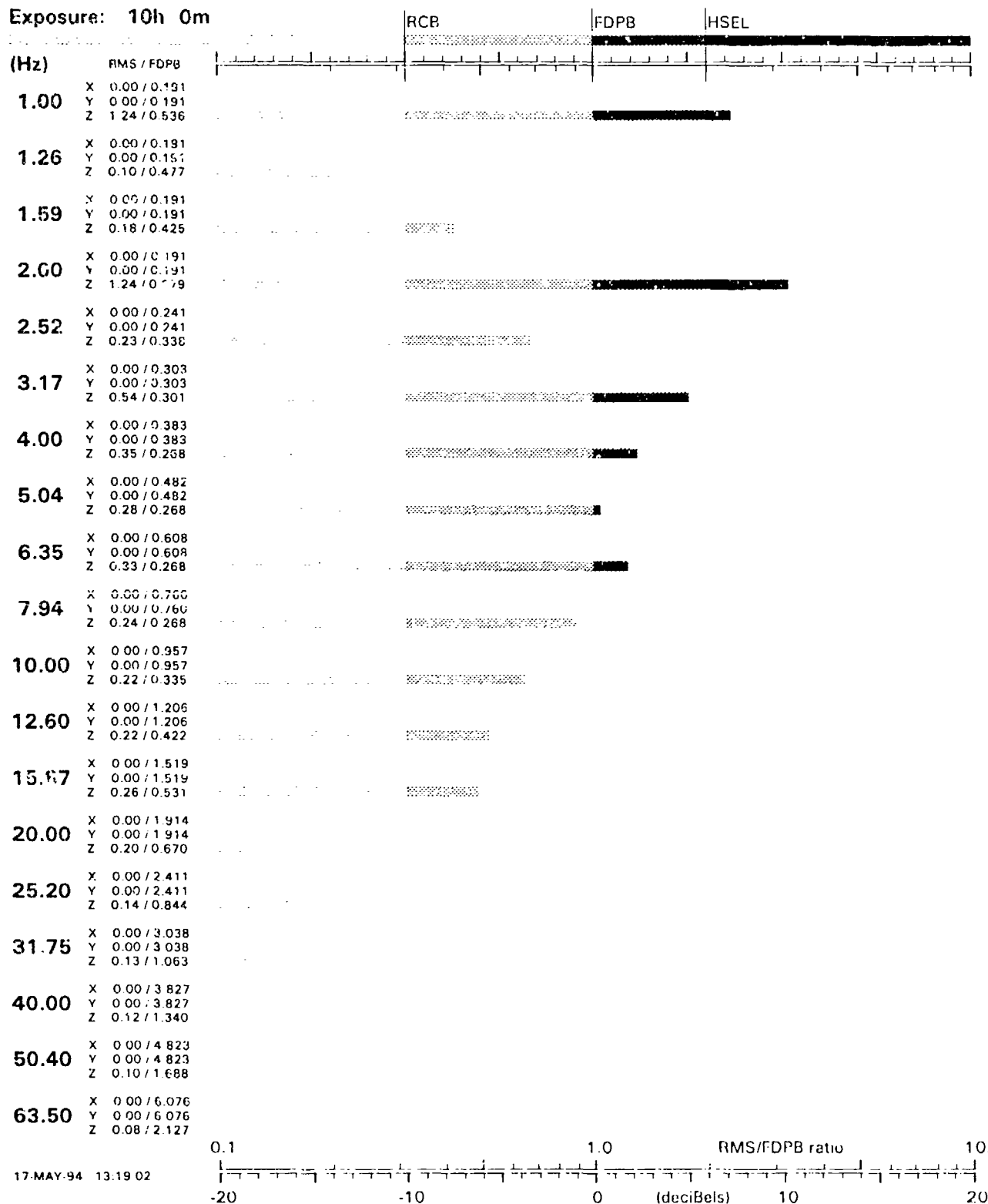
RUN-33

May 20, 1992

P-seat

PLS truck

Exposure: 10h 0m



Course: #5 APG
 Speed: 5 mph
 Note: HHA of PLS truck, passenger (seat)

USAARL summary of analysis
per ISO 2631* guideline on
whole-body vibration (WBV)

RUN-33 D-seat

17-MAY-94 13:19:02

Sensor.... D-seat
Course.... #5 APG
Speed..... 5 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.0900	0.7707	0:12	2:09	6:03
1.00	1.0700	0.5250	0:30	3:46	10:00
3.17	0.5100	0.4340	0:40	4:48	12:22
4.00	0.3400	0.3400	1:13	7:15	17:50
6.35	0.2800	0.2800	1:42	9:26	22:37

* International Standard Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-33

May 20, 1992

D-seat

PLS truck

Exposure: 10h 0m

(Hz)

RMS / FDPB
 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 1.07 / 0.536

1.26
 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.09 / 0.477

1.59
 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.16 / 0.425

2.00
 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 1.09 / 0.379

2.52
 X 0.00 / 0.241
 Y 0.00 / 0.241
 Z 0.22 / 0.338

3.17
 X 0.00 / 0.303
 Y 0.00 / 0.303
 Z 0.51 / 0.301

4.00
 X 0.00 / 0.383
 Y 0.00 / 0.383
 Z 0.34 / 0.268

5.04
 X 0.00 / 0.482
 Y 0.00 / 0.482
 Z 0.28 / 0.268

6.35
 X 0.00 / 0.608
 Y 0.00 / 0.608
 Z 0.28 / 0.268

7.94
 X 0.00 / 0.700
 Y 0.00 / 0.700
 Z 0.22 / 0.268

10.00
 X 0.00 / 0.957
 Y 0.00 / 0.957
 Z 0.21 / 0.335

12.50
 X 0.00 / 1.206
 Y 0.00 / 1.206
 Z 0.17 / 0.422

15.87
 X 0.00 / 1.519
 Y 0.00 / 1.519
 Z 0.25 / 0.531

20.00
 X 0.00 / 1.914
 Y 0.00 / 1.914
 Z 0.18 / 0.670

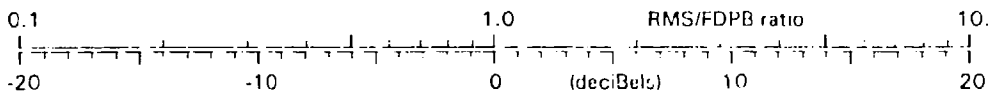
25.20
 X 0.00 / 2.411
 Y 0.00 / 2.411
 Z 0.11 / 0.844

31.75
 X 0.00 / 3.038
 Y 0.00 / 3.038
 Z 0.12 / 1.052

40.00
 X 0.00 / 3.827
 Y 0.00 / 3.827
 Z 0.11 / 1.340

50.40
 X 0.00 / 4.803
 Y 0.00 / 4.803
 Z 0.08 / 1.682

63.50
 X 0.00 / 6.076
 Y 0.00 / 6.076
 Z 0.07 / 2.127



17 MAY-94 13 19 02

Course: #5 APG
 Speed: 5 mph
 Note: HHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-34 P-seat

17-MAY-94 13:19:03

Sensor.... P-seat
Course.... #5 APG
Speed..... 7 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	2.5900	1.9314	0:01	0:22	1:36
1.00	2.9400	1.4700	0:01	0:37	2:17
5.04	0.6600	0.6600	0:16	2:45	7:31
3.17	0.7200	0.6410	0:16	2:53	7:50
6.35	0.5800	0.5800	0:22	3:20	8:57

* International Standards Organization (ISO) 2631

Comfort: Reduced comfort boundary

Fatigue: Fatigue-decreased proficiency boundary

Health: Health and safety exposure limit

HSFL: Health and safety exposure limit
 FDPB: Fatigue decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

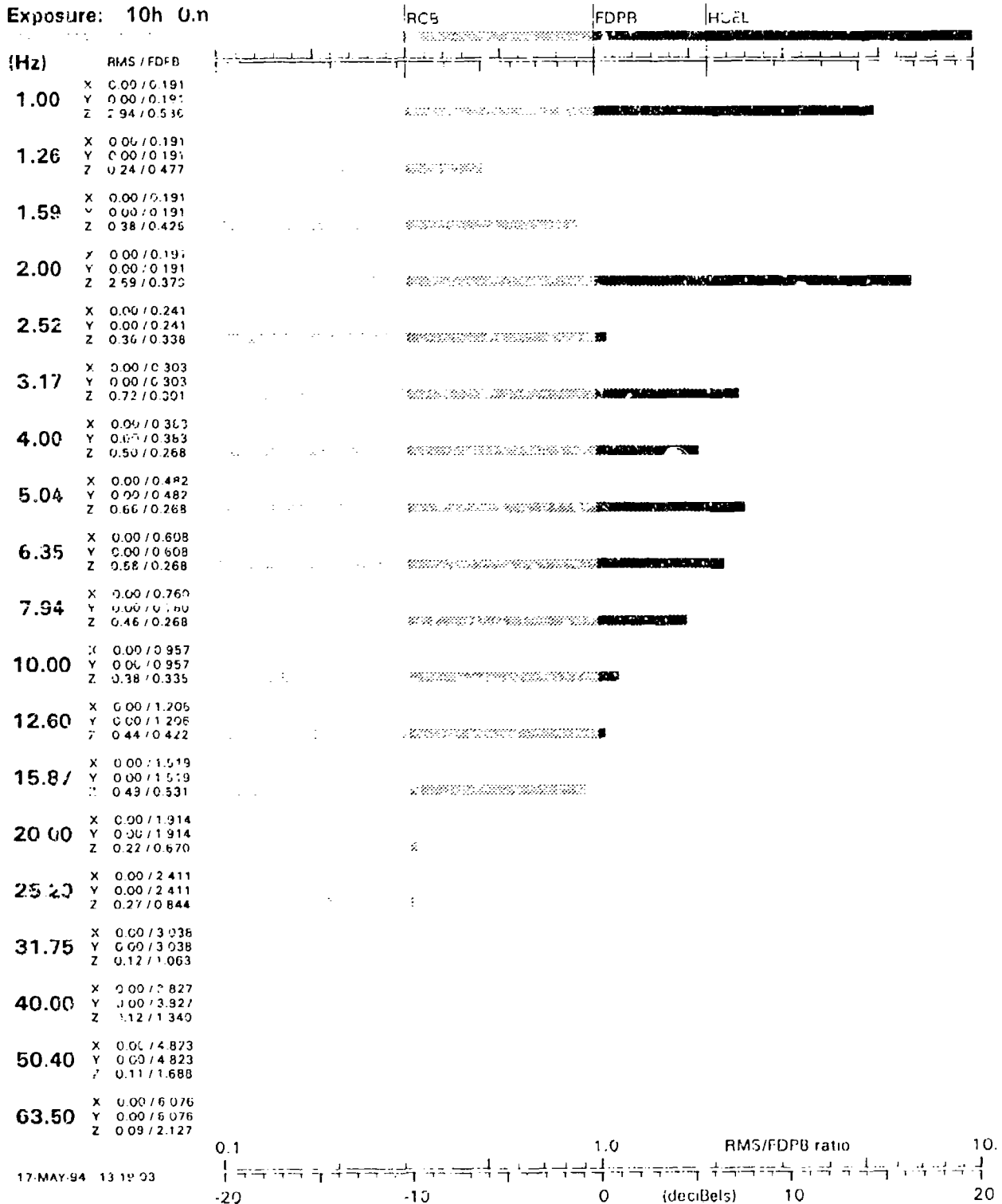
RUN-34

May 20, 1992

P-seat

PLS truck

Exposure: 10h 0.0



Course: #5 APG
 Speed: 7 mph
 Note: HHA of PLS truck, passenger (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-34 D-seat

17-MAY-94 13:19:03

Sensor.... D-seat
Course.... #5 APG
Speed..... 7 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	2.7600	1.9516	0:01	0:18	1:25
1.00	3.0600	1.5300	0:01	0:34	2:10
3.17	0.8800	0.7834	0:12	2:04	5:56
6.35	0.7600	0.7600	0:12	2:12	6:11
5.04	0.5700	0.5700	0:24	3:27	9:11

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue decreased proficiency boundary
Health ... Health and safety exposure limit

HSFL Health and safety exposure limit
 FDPB Fatigue-decreased proficiency boundary
 RCB Reduced comfort boundary
 RMS Vibration R.M.S. acceleration (m/s²)

X Longitudinal
 Y Transverse
 Z Vertical

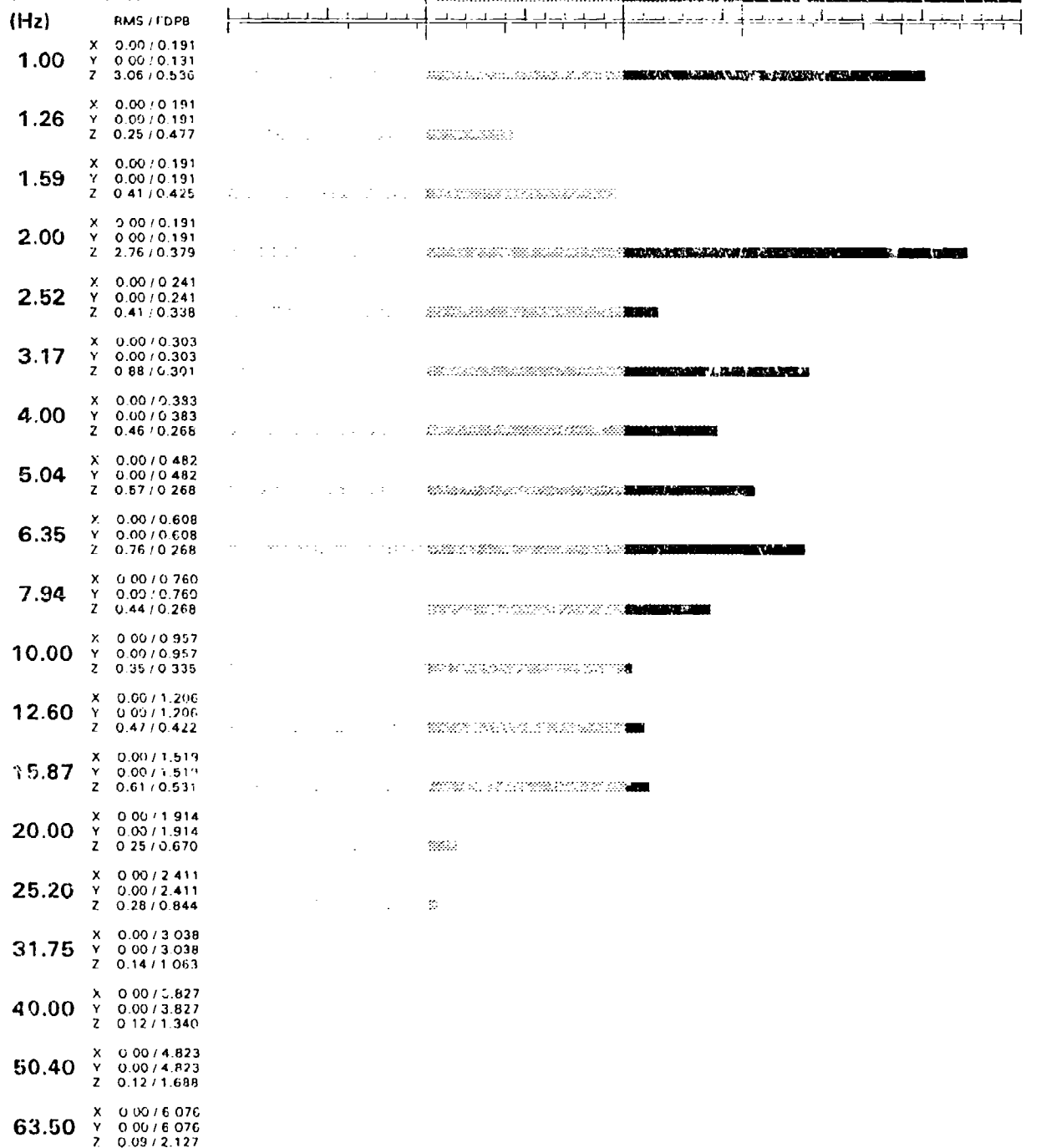
RUN-34

May 20, 1992

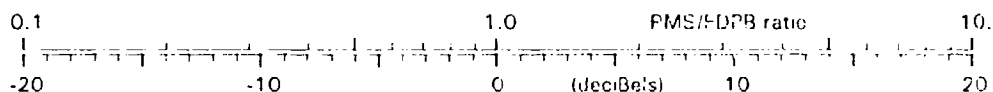
D-seat

PLS truck

Exposure: 10h 0m



17 MAY 94 13:19:03



Course: #5 APG
 Speed: 7 mph
 Note: HHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-35 P-seat

17-MAY-94 13:19:03

Sensor.... P-seat
Course.... #5 APG
Speed..... 6 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
1.00	3.0900	1.5450	0:01	0:33	2:08
2.00	1.5400	1.0889	0:01	1:12	3:41
3.17	0.8700	0.7745	0:12	2:08	6:01
6.35	0.6300	0.6300	0:18	2:57	8:00
4.00	0.5200	0.5200	0:30	3:57	10:22

* International Standards Organization ISO 2631

Comfort ... Reduced comfort boundary

Fatigue ... Fatigue-decreased proficiency boundary

Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-35

May 20, 1992

P-seat

PLS truck

Exposure: 10h 0m

(Hz)

RMS / FDPB

1.00 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 3.09 / 0.536

1.26 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.25 / 0.477

1.59 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.23 / 0.425

2.00 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 1.54 / 0.379

2.52 X 0.00 / 0.241
 Y 0.00 / 0.241
 Z 0.37 / 0.338

3.17 X 0.00 / 0.303
 Y 0.00 / 0.303
 Z 0.87 / 0.301

4.00 X 0.00 / 0.383
 Y 0.00 / 0.383
 Z 0.52 / 0.263

5.04 X 0.00 / 0.482
 Y 0.00 / 0.482
 Z 0.51 / 0.268

6.35 X 0.00 / 0.608
 Y 0.00 / 0.608
 Z 0.63 / 0.268

7.94 X 0.00 / 0.760
 Y 0.00 / 0.760
 Z 0.45 / 0.268

10.00 X 0.00 / 0.957
 Y 0.00 / 0.957
 Z 0.34 / 0.335

12.60 X 0.00 / 1.206
 Y 0.00 / 1.206
 Z 0.41 / 0.422

15.87 X 0.00 / 1.519
 Y 0.00 / 1.519
 Z 0.33 / 0.531

20.00 X 0.00 / 1.914
 Y 0.00 / 1.914
 Z 0.18 / 0.670

25.20 X 0.00 / 2.411
 Y 0.00 / 2.411
 Z 0.21 / 0.844

31.75 X 0.00 / 3.038
 Y 0.00 / 3.038
 Z 0.14 / 1.063

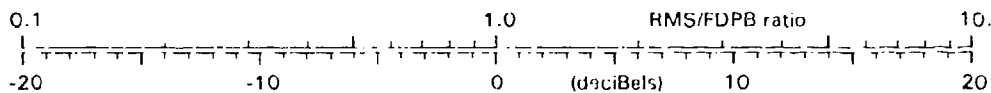
40.00 X 0.00 / 3.827
 Y 0.00 / 3.827
 Z 0.12 / 1.340

50.40 X 0.00 / 4.823
 Y 0.00 / 4.823
 Z 0.12 / 1.688

63.50 X 0.00 / 6.076
 Y 0.00 / 6.076
 Z 0.10 / 2.127



17 MAY 94 13 19 03



Course: #5 APG

Speed: 6 mph

Note: IHA of PLS truck, passenger (seat)

USAARI summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-35 D-seat

17-MAY-94 13:19:23

Sensor.... D-seat
Course.... #5 APG
Speed..... 6 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	2.3400	1.6546	0:01	0:30	1:53
1.00	3.0700	1.5350	0:01	0:33	2:09
3.17	0.8700	0.7745	0:12	2:08	6:01
4.00	0.5000	0.5000	0:32	4:11	10:56
7.94	0.4800	0.4800	0:34	4:26	11:30

* International Standards Organization ISO 2631.

Comfort ... reduced comfort boundary

Fatigue ... Fatigue-decreased proficiency boundary

Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

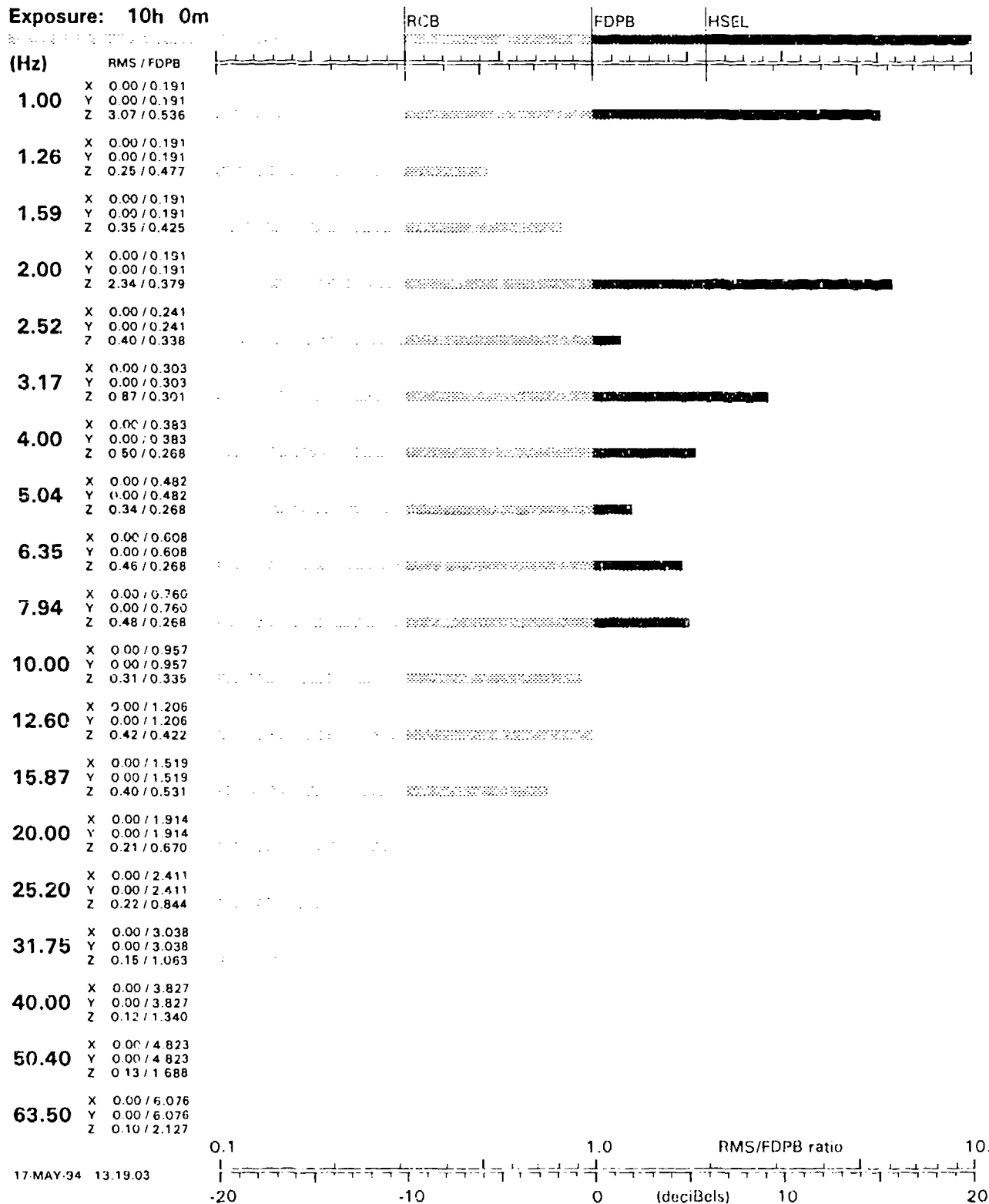
RUN-35

May 20, 1992

D-seat

PLS truck

Exposure: 10h 0m



Course: #5 APG
 Speed: 6 mph
 Note: HHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-36 P-seat

17-MAY-94 13:19:04

Sensor.... P-seat
Course.... #4 APG
Speed..... 10 mph
Vehicle... PLS truck
Date..... May 21, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
4.00	0.4800	0.4800	0:34	4:26	11:30
3.17	0.4700	0.4184	0:47	5:24	13:45
2.00	0.5900	0.4172	0:47	5:26	13:48
5.04	0.3100	0.3100	1:25	8:12	20:00
6.35	0.2700	0.2700	1:49	9:53	23:37

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary

Fatigue ... Fatigue-decreased proficiency boundary

Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-36

May 21, 1992

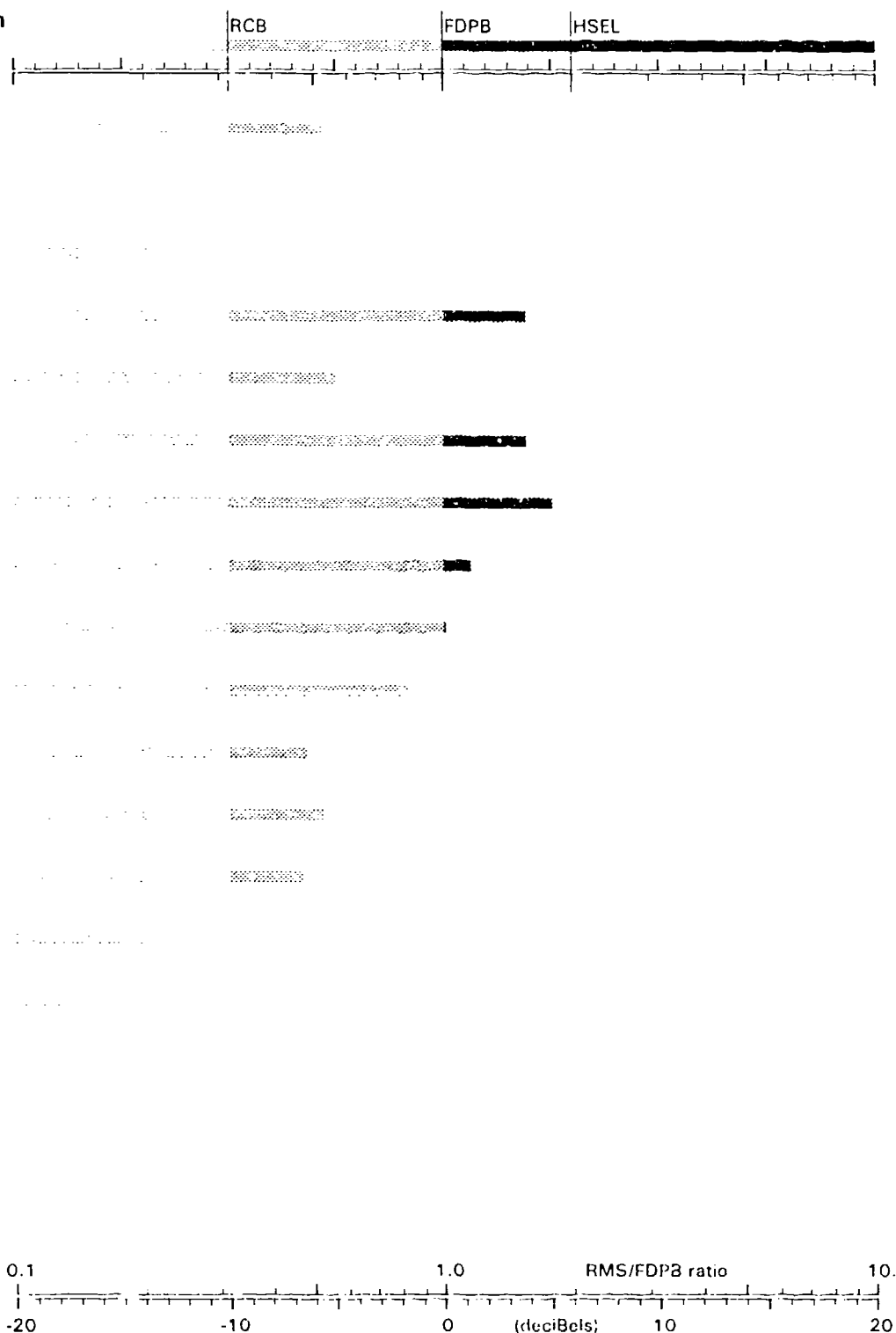
P-seat

PLS truck

Exposure: 10h 0m

(Hz)

	RMS / FDPB
1.00	X 0.00 / 0.191 Y 0.00 / 0.191 Z 0.28 / 0.536
1.26	X 0.00 / 0.191 Y 0.00 / 0.191 Z 0.02 / 0.477
1.59	X 0.00 / 0.191 Y 0.00 / 0.191 Z 0.09 / 0.425
2.00	X 0.00 / 0.191 Y 0.00 / 0.191 Z 0.59 / 0.379
2.52	X 0.00 / 0.241 Y 0.00 / 0.241 Z 0.19 / 0.338
3.17	X 0.00 / 0.303 Y 0.00 / 0.303 Z 0.47 / 0.301
4.00	X 0.00 / 0.383 Y 0.00 / 0.383 Z 0.48 / 0.268
5.04	X 0.00 / 0.482 Y 0.00 / 0.482 Z 0.31 / 0.268
6.35	X 0.00 / 0.608 Y 0.00 / 0.608 Z 0.27 / 0.268
7.94	X 0.00 / 0.760 Y 0.00 / 0.760 Z 0.22 / 0.268
10.00	X 0.00 / 0.957 Y 0.00 / 0.957 Z 0.16 / 0.335
12.60	X 0.00 / 1.206 Y 0.00 / 1.206 Z 0.22 / 0.422
15.87	X 0.00 / 1.519 Y 0.00 / 1.519 Z 0.25 / 0.531
20.00	X 0.00 / 1.914 Y 0.00 / 1.914 Z 0.14 / 0.670
25.20	X 0.00 / 2.411 Y 0.00 / 2.411 Z 0.13 / 0.844
31.75	X 0.00 / 3.038 Y 0.00 / 3.038 Z 0.10 / 1.063
40.00	X 0.00 / 3.827 Y 0.00 / 3.827 Z 0.10 / 1.340
50.40	X 0.00 / 4.823 Y 0.00 / 4.823 Z 0.06 / 1.688
63.50	X 0.00 / 6.076 Y 0.00 / 6.076 Z 0.05 / 2.127



17-MAY-94 13:19:04

Course: #4 APG
 Speed: 10 mph
 Note: HHA of PLS truck, passenger (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-36 D-seat

17-MAY-94 13:19:04

Senscr.... D-seat
Course.... #4 APG
Speed.... 10 mph
Vehicle... PLS truck
Date..... May 21, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s^2)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
5.00	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
4.00	0.5600	0.5600	0:24	3:31	9:23
2.00	0.6500	0.4596	0:38	4:42	12:11
3.17	0.4700	0.4184	0:47	5:24	13:45
6.35	0.3700	0.3700	1:02	6:26	16:02
5.04	0.3600	0.3600	1:06	6:41	16:37

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary

Fatigue ... Fatigue decreased proficiency boundary

Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-36

May 21, 1992

D-seat

PLS truck

Exposure: 10h 0m

(Hz)

RMS / FDPB

1.00 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.27 / 0.536

1.26 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.02 / 0.477

1.59 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.10 / 0.425

2.00 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.65 / 0.373

2.52 X 0.00 / 0.191
 Y 0.00 / 0.241
 Z 0.19 / 0.336

3.17 X 0.00 / 0.303
 Y 0.00 / 0.303
 Z 0.47 / 0.301

4.00 X 0.00 / 0.393
 Y 0.00 / 0.383
 Z 0.56 / 0.248

5.04 X 0.00 / 0.452
 Y 0.00 / 0.482
 Z 0.36 / 0.268

6.35 X 0.00 / 0.508
 Y 0.00 / 0.603
 Z 0.37 / 0.268

7.94 X 0.00 / 0.550
 Y 0.00 / 0.750
 Z 0.23 / 0.268

10.00 X 0.00 / 0.957
 Y 0.00 / 0.957
 Z 0.22 / 0.336

12.60 X 0.00 / 1.206
 Y 0.00 / 1.206
 Z 0.23 / 0.422

15.87 X 0.00 / 1.514
 Y 0.00 / 1.514
 Z 0.29 / 0.531

20.00 X 0.00 / 1.914
 Y 0.00 / 1.914
 Z 0.15 / 0.670

25.20 X 0.00 / 2.411
 Y 0.00 / 2.411
 Z 0.13 / 0.844

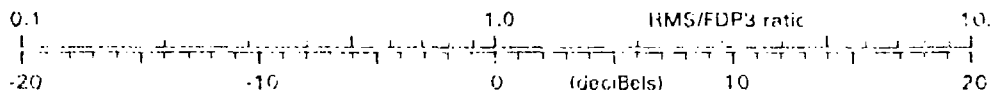
31.75 X 0.00 / 3.038
 Y 0.00 / 3.038
 Z 0.11 / 1.063

40.00 X 0.00 / 3.827
 Y 0.00 / 3.827
 Z 0.09 / 1.340

50.40 X 0.00 / 4.823
 Y 0.00 / 4.823
 Z 0.07 / 1.688

63.50 X 0.00 / 6.076
 Y 0.00 / 6.076
 Z 0.06 / 2.127

17 MAY 92 13:19:04



Course: #4 APG

Speed: 10 mph

Note: HHA of PLS truck, driver (seat)

USAARI summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-38 P-seat

17-MAY-92 13:19:05

Sensor.... P seat
Course.... #4 APG
Speed..... 5 mph
Vehicle.... PLS truck
Date..... May 21, 1992
Note..... HKA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.2900	0.9122	0:01	1:37	4:46
1.00	0.8300	0.4150	0:48	5:28	13:53
6.35	0.2700	0.2700	1:49	9:53	23:37
4.00	0.2500	0.2500	2:03	10:57	25:52
3.17	0.2600	0.2315	2:19	12:07	28:22

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary

Fatigue ... Fatigue-decreased proficiency boundary

Health ... Health and safety exposure limit

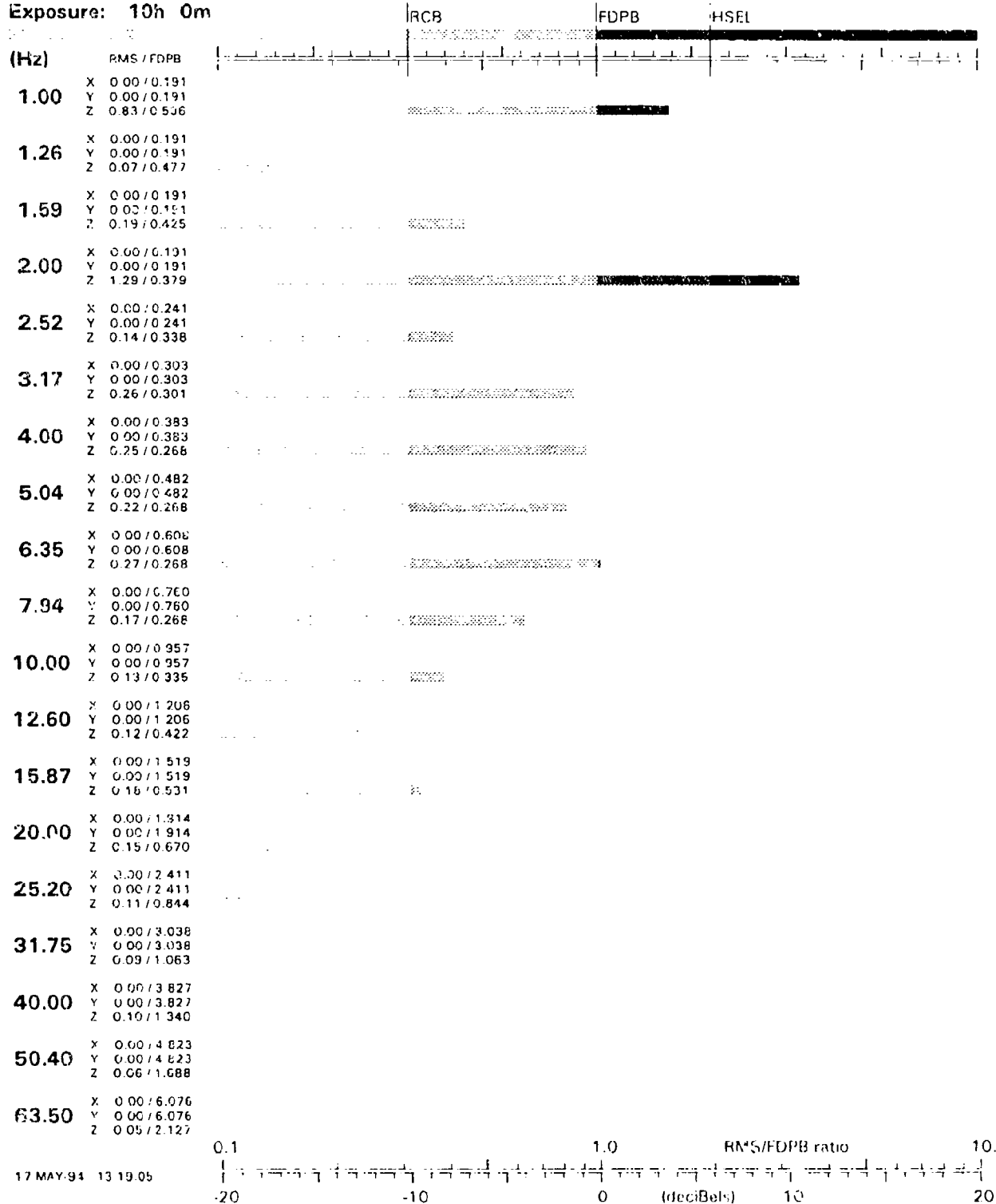
HSEL: Health and safety exposure limit
 FDPB: Fatigue decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X Longitudinal
 Y Transverse
 Z Vertical

RUN-38
May 21, 1992

P-seat
PLS truck

Exposure: 10h 0m



17 MAY 94 13 19 05

Course: #4 APG
 Speed: 5 mph
 Note: IMA of PLS truck, passenger (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-38 D-seat

17-MAY-94 13:19:05

Sensor.... D-seat
Course.... #4 APG
Speed..... 5 mph
Vehicle... PLS truck
Date..... May 21, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.3400	0.9475	0:01	1:30	4:31
1.00	0.8700	0.4350	0:42	5:07	13:04
3.17	0.3800	0.3383	1:14	7:18	17:55
4.00	0.2800	0.2800	1:42	9:26	22:37
5.04	0.2300	0.2300	2:20	12:12	28:32

* International Standards Organization ISO 2631

Comfort Reduced comfort boundary
Fatigue Fatigue decreased productivity boundary
Health Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration RMS acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

RUN-38

May 21, 1992

D-seat

PLS truck

Exposure: 10h 0m

(Hz) RMS / FDPB

1.00 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.87 / 0.536

1.26 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.07 / 0.477

1.59 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 0.20 / 0.425

2.00 X 0.00 / 0.191
 Y 0.00 / 0.191
 Z 1.34 / 0.379

2.52 X 0.00 / 0.241
 Y 0.00 / 0.241
 Z 0.18 / 0.338

3.17 X 0.00 / 0.303
 Y 0.00 / 0.303
 Z 0.38 / 0.301

4.00 X 0.00 / 0.383
 Y 0.00 / 0.383
 Z 0.28 / 0.268

5.04 X 0.00 / 0.482
 Y 0.00 / 0.482
 Z 0.23 / 0.268

6.35 X 0.00 / 0.608
 Y 0.00 / 0.608
 Z 0.22 / 0.268

7.94 X 0.00 / 0.760
 Y 0.00 / 0.760
 Z 0.16 / 0.268

10.00 X 0.00 / 0.957
 Y 0.00 / 0.957
 Z 0.11 / 0.335

12.60 X 0.00 / 1.206
 Y 0.00 / 1.206
 Z 0.10 / 0.422

15.87 X 0.00 / 1.519
 Y 0.00 / 1.519
 Z 0.16 / 0.531

20.00 X 0.00 / 1.914
 Y 0.00 / 1.914
 Z 0.14 / 0.670

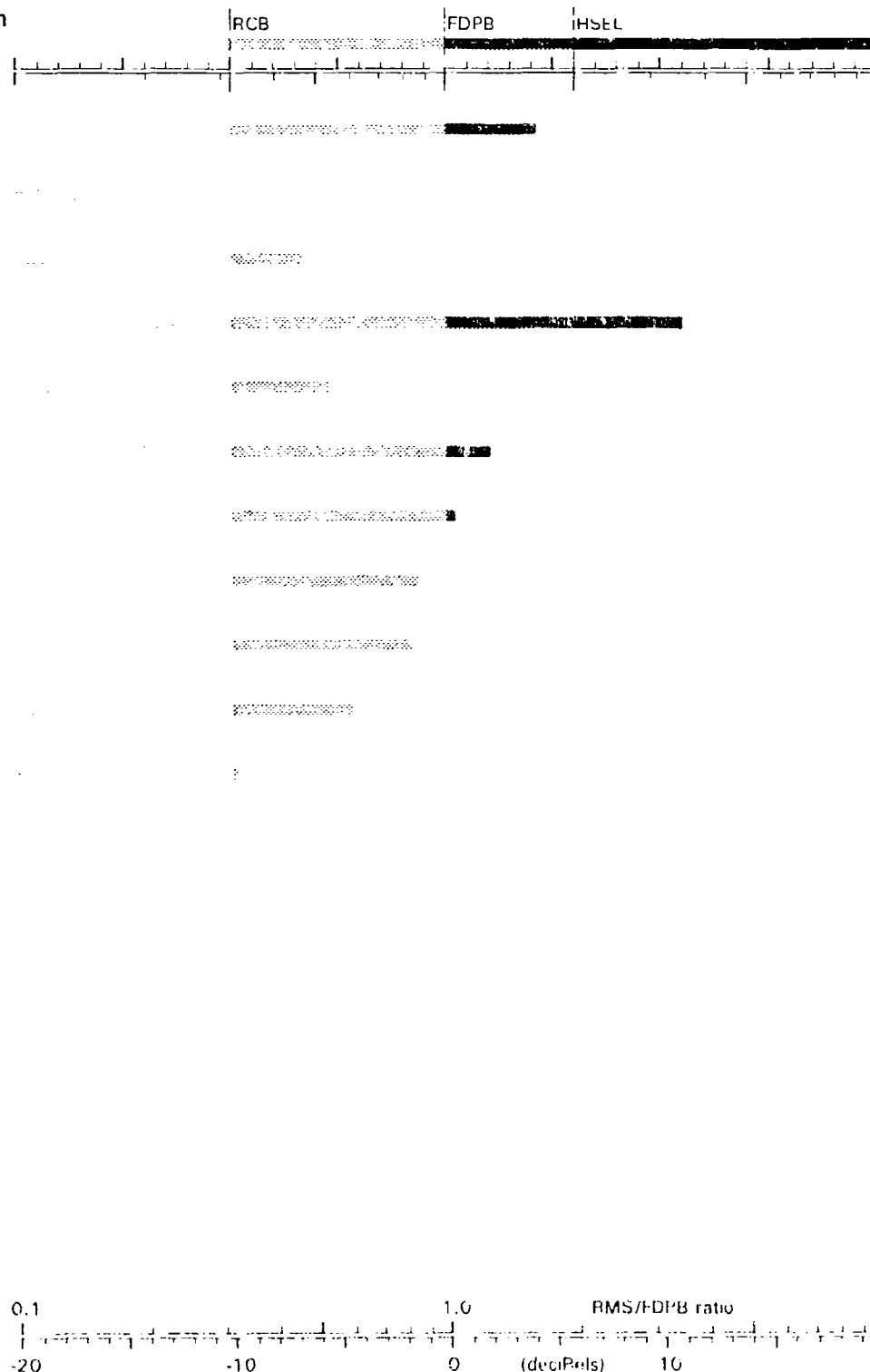
25.20 X 0.00 / 2.411
 Y 0.00 / 2.411
 Z 0.11 / 0.844

31.75 X 0.00 / 3.038
 Y 0.00 / 3.038
 Z 0.09 / 1.063

40.00 X 0.00 / 3.827
 Y 0.00 / 3.827
 Z 0.09 / 1.340

50.40 X 0.00 / 4.823
 Y 0.00 / 4.823
 Z 0.07 / 1.689

63.50 X 0.00 / 6.076
 Y 0.00 / 6.076
 Z 0.06 / 2.127



17 MAY 94 15:19 05

Course: #4 APG
 Speed: 5 mph
 Note: HHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-40 P-seat

17-MAY-94 13:19:06

Sensor.... P-seat
Course.... #4 APG
Speed..... 8 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.8500	1.3081	0:01	0:48	2:46
4.00	0.4800	0.4800	0:34	4:26	11:30
3.17	0.4500	0.4000	0:51	5:46	14:30
6.35	0.2800	0.2800	1:42	9:26	22:37
1.00	0.5600	0.2800	1:42	9:26	22:37

* International Standards Organization ISO 2631:

Comfort ... reduced comfort boundary

Fatigue ... Fatigue-decreased proficiency boundary

Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

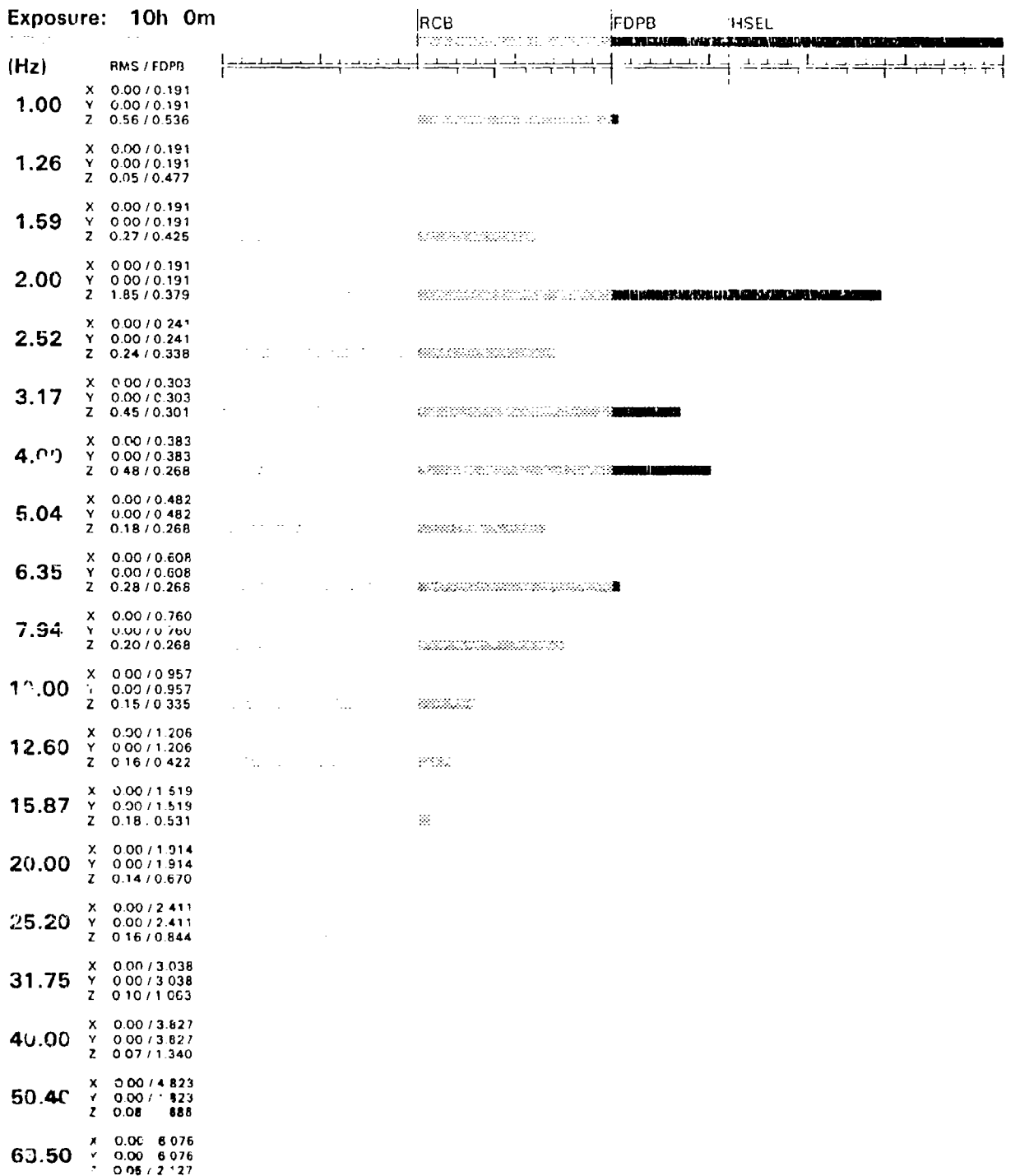
RUN-40

May 20, 1992

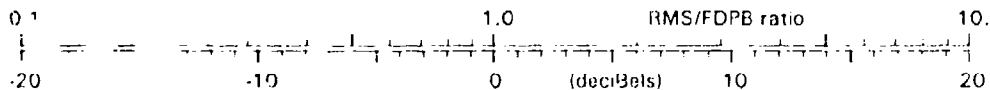
P-seat

PLS truck

Exposure: 10h 0m



1 MAY 92 13:19:06



Course: #4 AIR
 Speed: 3 mph
 Note: PLS truck, passenger (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-40 D-seat

17-MAY-94 13:19.06

Sensor.... D-seat
Course.... #4 APG
Speed..... 8 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	2.1100	1.4920	0:01	0:36	2:15
4.00	0.3200	0.3200	1:22	7:52	19:13
1.00	0.6100	0.3050	1:29	8:23	20:12
6.35	0.2900	0.2900	1:37	9:00	21:40
3.17	0.3100	0.2760	1:45	9:37	23:00

* International Standards Organization, ISO 2631.

Comfort ... Reduced comfort boundary

Fatigue ... Fatigue-decreased proficiency boundary

Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

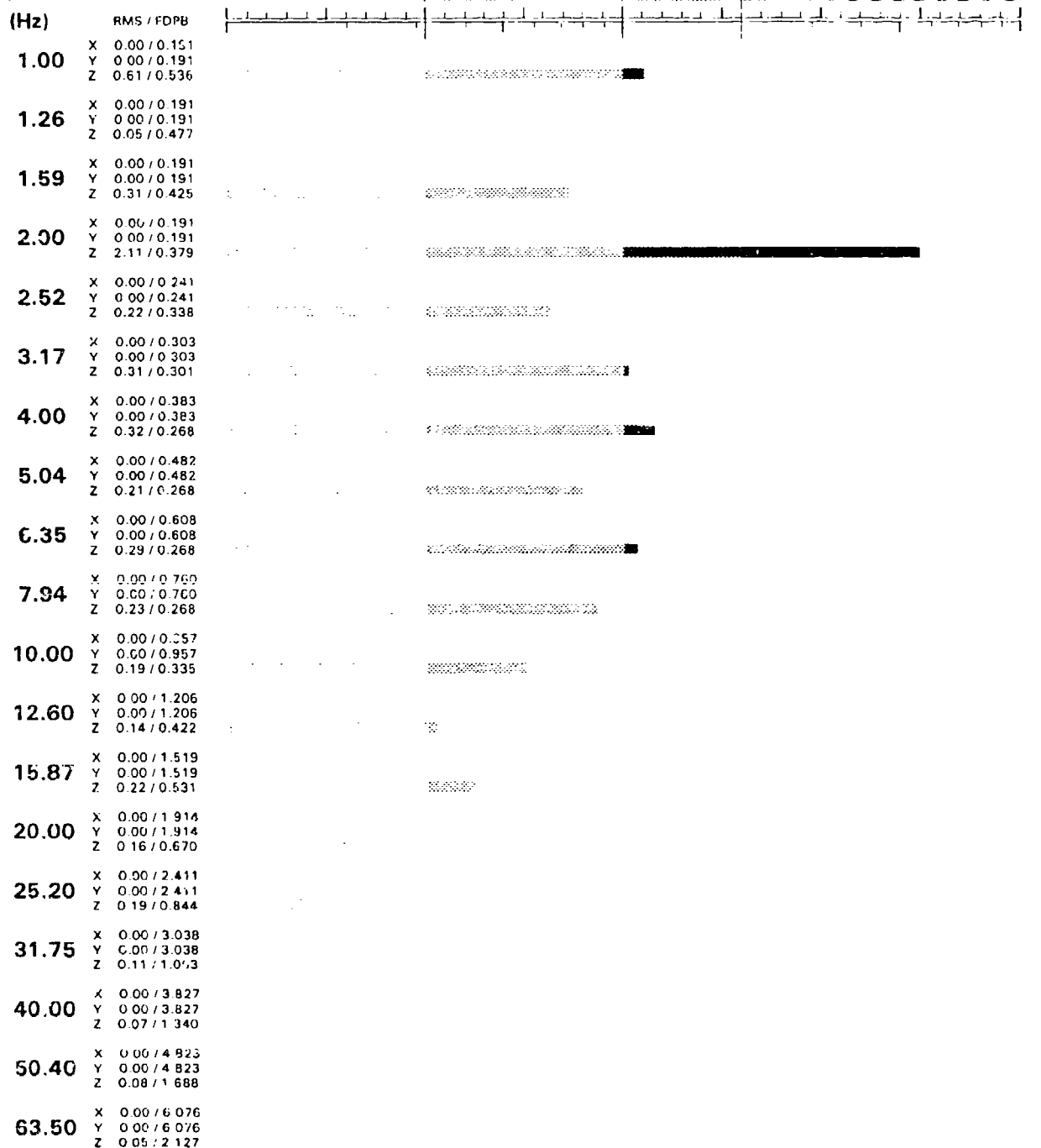
RUN-40

May 20, 1992

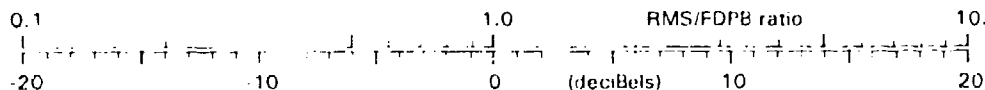
D-seat

PLS truck

Exposure: 10h 0m



17 MAY 94 13 19.06



Course: #4 APG
 Speed: 8 mph
 Note: HHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-43 P-seat

17-MAY-94 13:19:08

Sensor.... P-seat
Course.... #4 APG
Speed..... 13 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
4.00	1.3800	1.3800	0:01	0:42	2:32
3.17	1.0400	0.9258	0:01	1:35	4:39
2.00	0.8200	0.5798	0:22	3:20	8:57
5.04	0.5500	0.5500	0:28	3:38	9:37
6.35	0.4300	0.4300	0:44	5:13	13:15

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

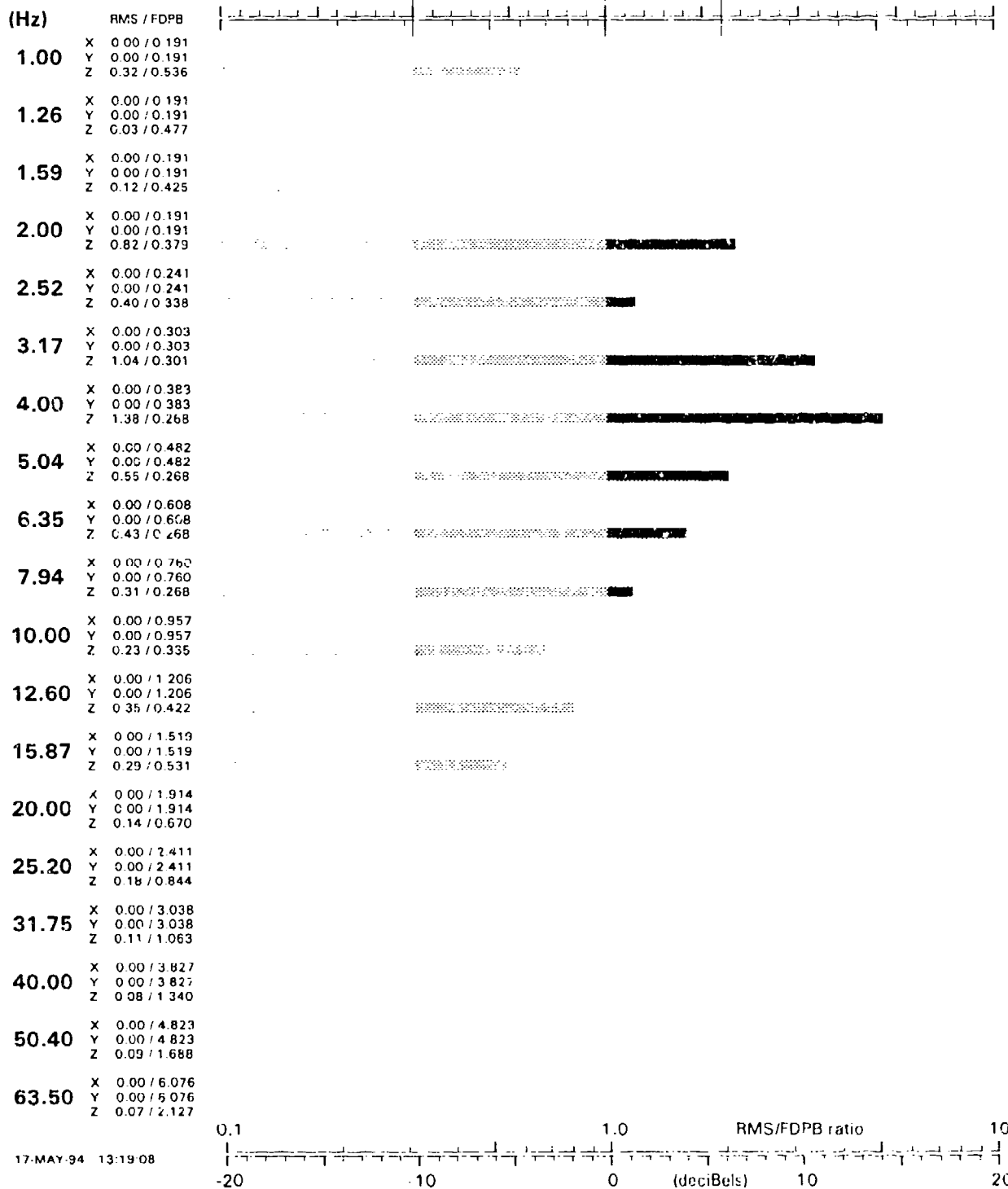
RUN-43

May 20, 1992

P-seat

PLS truck

Exposure: 10h 0m



Course: #4 APG
 Speed: 13 mph
 Note: HHA of PLS truck, passenger (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-43 D-seat

17-MAY-94 13:19:08

Sensor.... D-seat
Course.... #4 APG
Speed..... 13 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
4.00	1.3700	1.3700	0:01	0:44	2:34
5.04	1.0000	1.0000	0:01	1:22	4:09
3.17	1.0000	0.8902	0:01	1:40	4:56
6.35	0.6400	0.6400	0:16	2:53	7:50
2.00	0.6900	0.4879	0:33	4:20	11:15

* International Standards Organization ISO 2631: Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

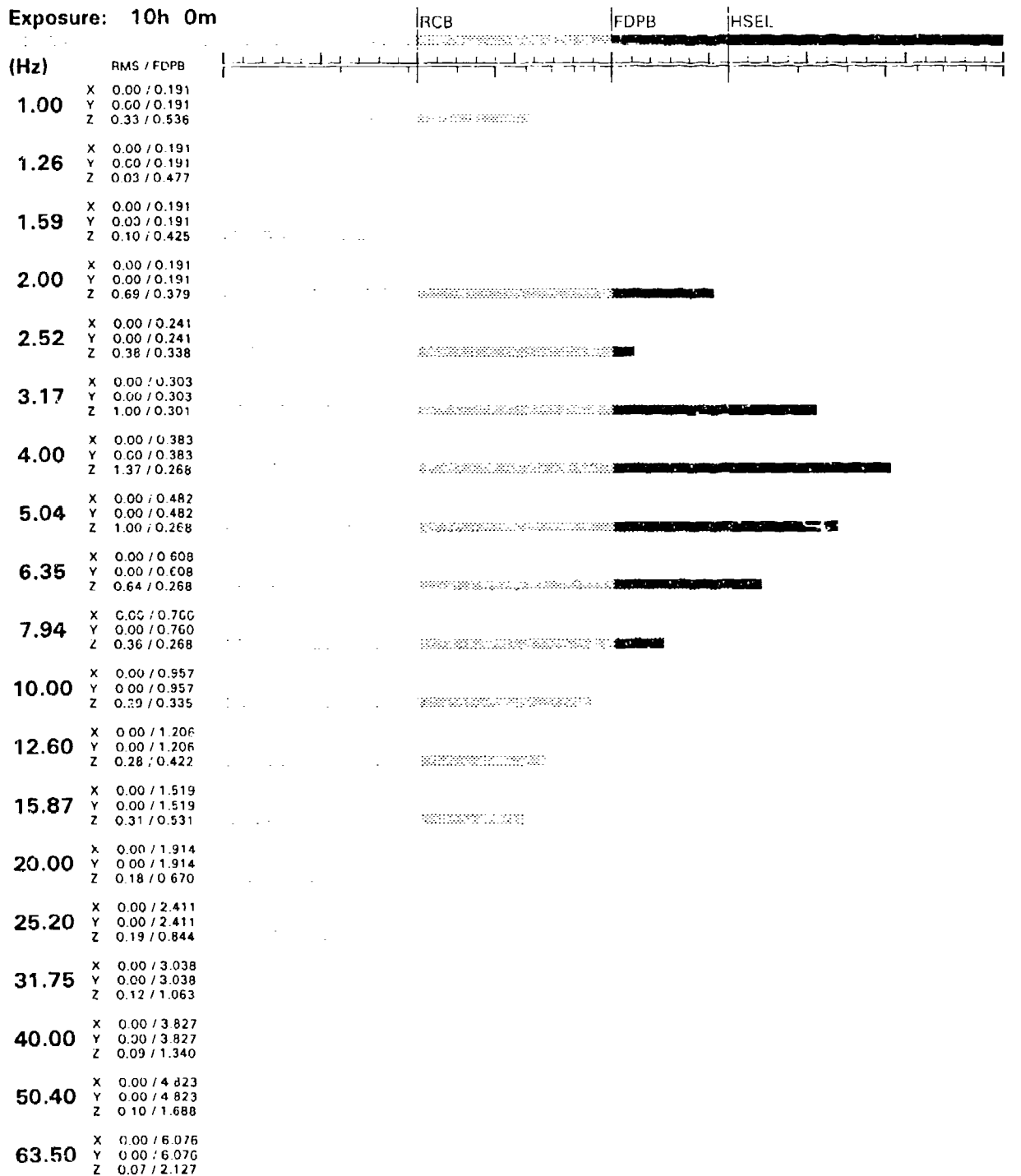
RUN-43

May 20, 1992

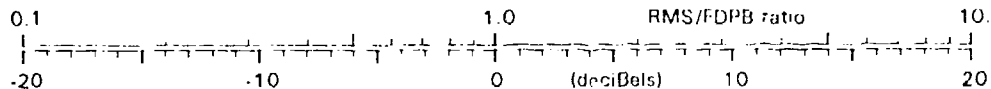
D-seat

PLS truck

Exposure: 10h 0m



17-MAY 94 13:19:08



Course: #4 APG
 Speed: 13 mph
 Note: HHA of PLS truck, driver (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-45 P-seat

17-MAY-94 13:19:09

Sensor.... P-seat
Course.... #4 APG
Speed..... 9 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, passenger (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.5200	1.0748	0:01	1:13	3:45
3.17	0.6500	0.5786	0:22	3:21	9:00
4.00	0.5300	0.5300	0:30	3:49	10:07
6.35	0.2400	0.2400	2:12	11:33	27:10
2.52	0.2900	0.2302	2:20	12:11	28:32

* International Standards Organization ISO 2631-

Comfort ... Reduced comfort boundary

Fatigue ... Fatigue-decreased proficiency boundary

Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

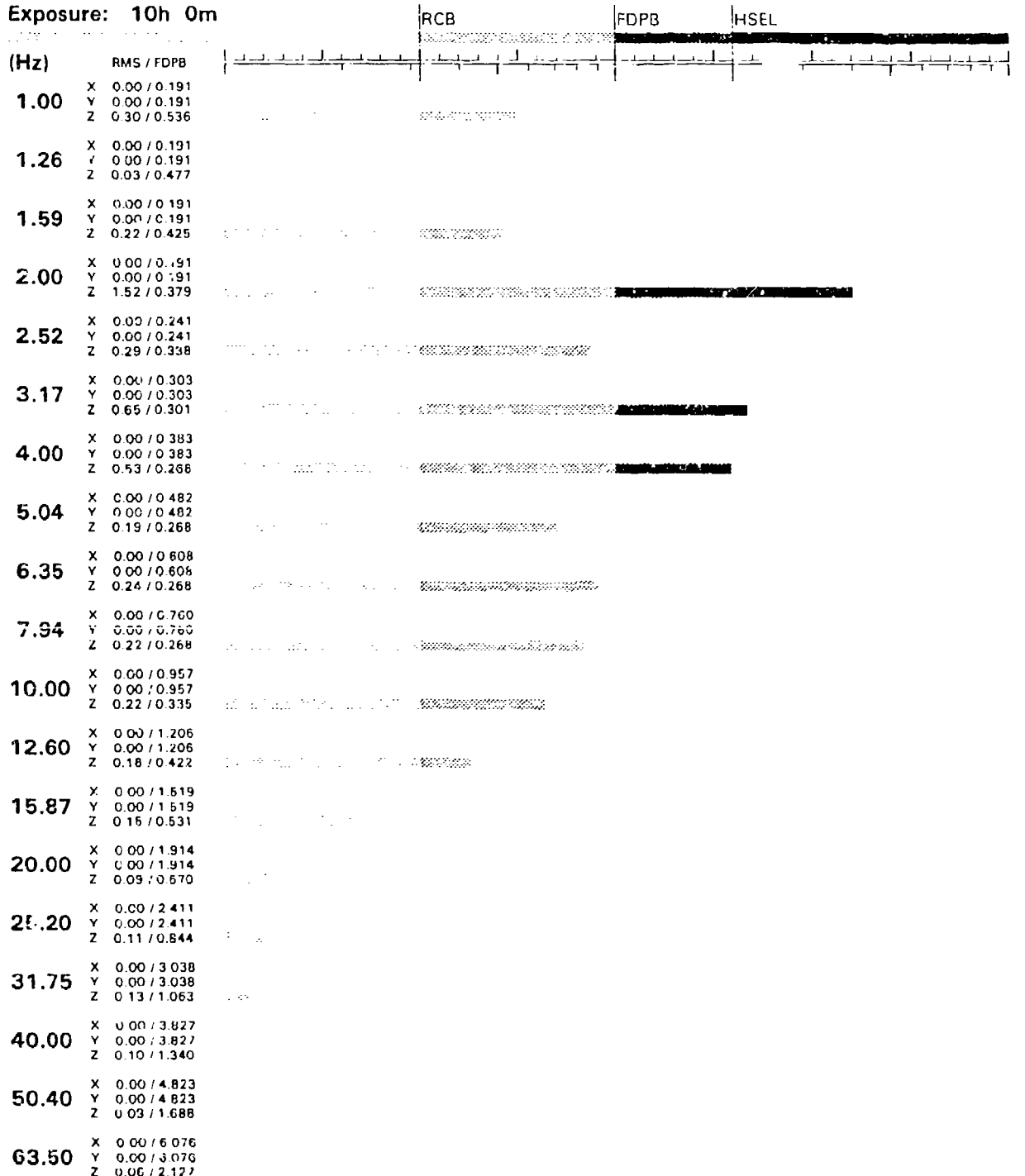
RUN-45

May 20, 1992

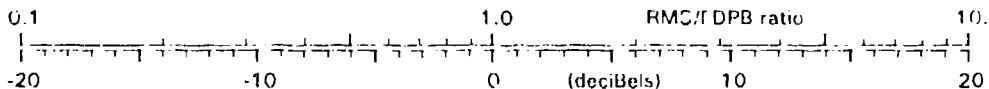
P-seat

PLS truck

Exposure: 10h 0m



17-MAY 94 13:19:09



Course: #4 APG
 Speed: 9 mph
 Note: HHA of PLS truck, passenger (seat)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-45 D-seat

17-MAY-94 13:19:09

Sensor.... D-seat
Course.... #4 APG
Speed..... 9 mph
Vehicle... PLS truck
Date..... May 20, 1992
Note..... HHA of PLS truck, driver (seat)

Third-octave bands with greatest
weighted RMS accelerations (m/s²)

Durations of WBV exposure
before reaching ISO limits*
(given in hours:minutes)

X: Longitudinal

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Y: Transverse

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
63.50	0.0000	0.0000	0:01	0:01	0:01
50.40	0.0000	0.0000	0:01	0:01	0:01
40.00	0.0000	0.0000	0:01	0:01	0:01
31.75	0.0000	0.0000	0:01	0:01	0:01
25.20	0.0000	0.0000	0:01	0:01	0:01

Z: Vertical

(Hz)	actual	weighted	COMFORT	FATIGUE	HEALTH
2.00	1.4300	1.0112	0:01	1:22	4:05
3.17	0.7100	0.6321	0:18	2:56	8:00
4.00	0.6300	0.6300	0:18	2:57	8:00
7.94	0.3100	0.3100	1:25	8:12	20:00
6.35	0.2800	0.2800	1:42	9:26	22:37

* International Standards Organization ISO 2631

Comfort ... Reduced comfort boundary

Fatigue ... Fatigue-decreased proficiency boundary

Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
 FDPB: Fatigue-decreased proficiency boundary
 RCB: Reduced comfort boundary
 RMS: Vibration R.M.S. acceleration (m/s²)

X: Longitudinal
 Y: Transverse
 Z: Vertical

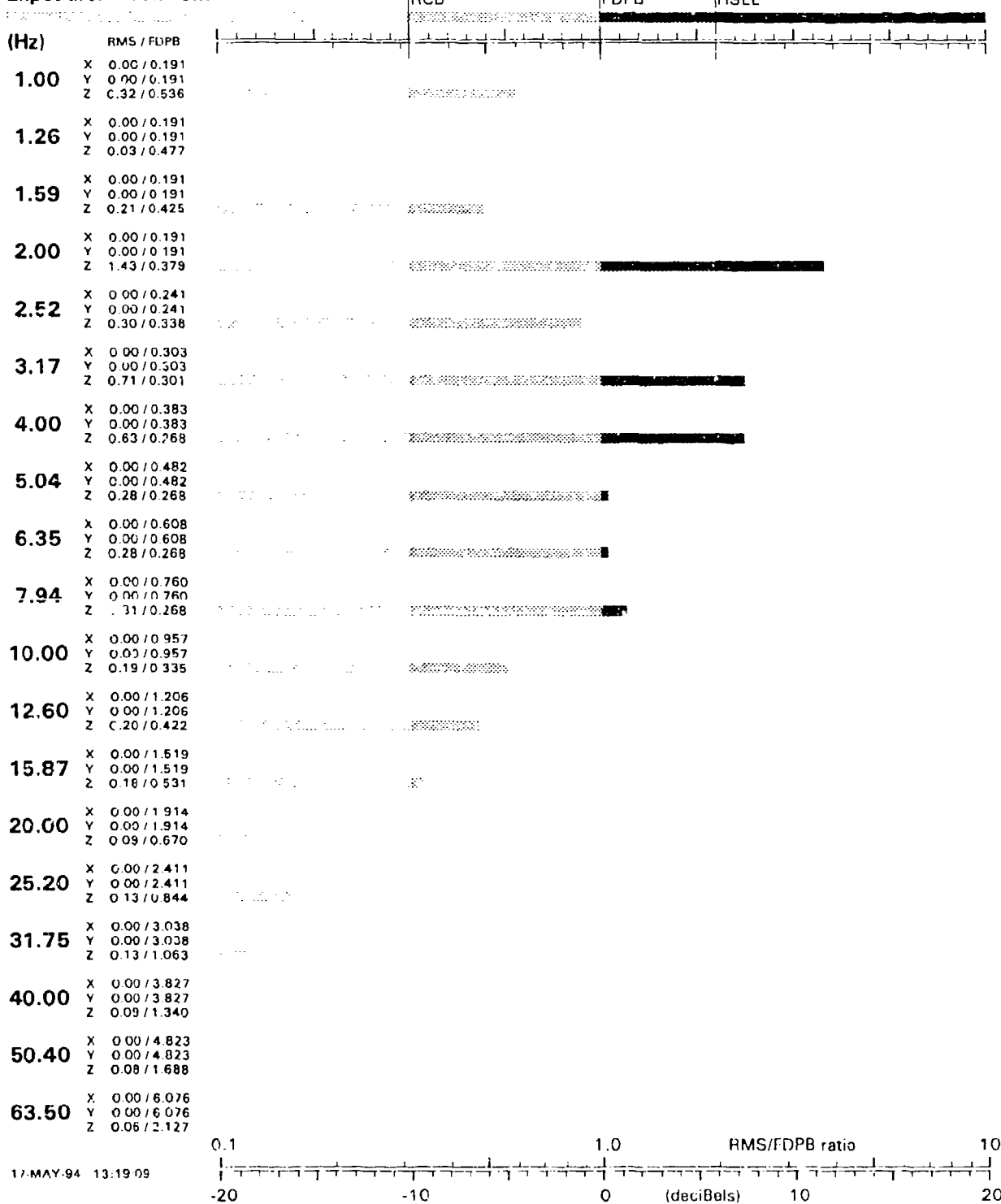
RUN-45

May 20, 1992

D-seat

PLS truck

Exposure: 10h 0m



17-MAY-94 13:19 09

Course: #4 APG
 Speed: 9 mph
 Note: HHA of PLS truck, driver (seat)

Initial distribution

Commander, U.S. Army Natick Research,
Development and Engineering Center
ATTN: SATNC-MIL (Documents
Librarian)
Natick, MA 01760-5040

Library
Naval Submarine Medical Research Lab
Box 900, Naval Sub Base
Groton, CT 06349-5900

Chairman
National Transportation Safety Board
800 Independence Avenue, S.W.
Washington, DC 20594

Executive Director, U.S. Army Human
Research and Engineering Directorate
ATTN: Technical Library
Aberdeen Proving Ground, MD 21005

Commander
10th Medical Laboratory
ATTN: Audiologist
APO New York 09180

Commander
Man-Machine Integration System
Code 602
Naval Air Development Center
Warminster, PA 18974

Naval Air Development Center
Technical Information Division
Technical Support Detachment
Warminster, PA 18974

Commander
Naval Air Development Center
ATTN: Code 602-B
Warminster, PA 18974

Commanding Officer, Naval Medical
Research and Development Command
National Naval Medical Center
Bethesda, MD 20814-5044

Commanding Officer
Armstrong Laboratory
Wright-Patterson
Air Force Base, OH 45433-6573

Deputy Director, Defense Research
and Engineering
ATTN: Military Assistant
for Medical and Life Sciences
Washington, DC 20301-3080

Director
Army Audiology and Speech Center
Walter Reed Army Medical Center
Washington, DC 20307-5001

Commander, U.S. Army Research
Institute of Environmental Medicine
Natick, MA 01760

Commander/Director
U.S. Army Combat Surveillance
and Target Acquisition Lab
ATTN: SFAE-IEW-JS
Fort Monmouth, NJ 07703-5305

Director
Federal Aviation Administration
FAA Technical Center
Atlantic City, NJ 08405

Commander, U.S. Army Test
and Evaluation Command
ATTN: AMSTE-AD-H
Aberdeen Proving Ground, MD 21005

Naval Air Systems Command
Technical Air Library 950D
Room 278, Jefferson Plaza II
Department of the Navy
Washington, DC 20361

Director
U.S. Army Ballistic
Research Laboratory
ATTN: DRXBR-OD-ST Tech Reports
Aberdeen Proving Ground, MD 21005

Commander
U.S. Army Medical Research
Institute of Chemical Defense
ATTN: SGRD-UV-AO
Aberdeen Proving Ground,
MD 21010-5425

Commander
USAMRDALC
ATTN: SGRD-RMS
Fort Detrick, Frederick, MD 21702-5012

Director
Walter Reed Army Institute of Research
Washington, DC 20307-5100

HQ DA (D. SG-PSP-O)
5109 Leesburg Pike
Falls Church, VA 22041-3258

Harry Diamond Laboratories
ATTN: Technical Information Branch
2800 Powder Mill Road
Adelphi, MD 20783-1197

U.S. Army Materiel Systems
Analysis Agency
ATTN: AMXSU-PA (Reports Processing)
Aberdeen Proving Ground
MD 21005-5071

U.S. Army Ordnance Center
and School Library
Simpson Hall, Building 3071
Aberdeen Proving Ground, MD 21005

U.S. Army Environmental
Hygiene Agency
ATTN: HSHB-MO-A
Aberdeen Proving Ground, MD 21010

Technical Library Chemical Research
and Development Center
Aberdeen Proving Ground, MD
21010-5423

Commander
U.S. Army Medical Research
Institute of Infectious Disease
ATTN: SGRD-UIZ-C
Fort Detrick, Frederick, MD 21702

Director, Biological
Sciences Division
Office of Naval Research
600 North Quincy Street
Arlington, VA 22217

Commander
U.S. Army Materiel Command
ATTN: AMCDE-XS
5001 Eisenhower Avenue
Alexandria, VA 22333

Commandant
U.S. Army Aviation
Logistics School ATTN: ATSQ-TDN
Fort Eustis, VA 23604

Headquarters (ATMD)
U.S. Army Training
and Doctrine Command
ATTN: ATBO-M
Fort Monroe, VA 23651

IAF Liaison Officer for Safety
USAF Safety Agency/SEFF
9750 Avenue G, SE
Kirtland Air Force Base
NM 87117-5671

Naval Aerospace Medical
Institute Library
Building 1953, Code 03L
Pensacola, FL 32508-5600

Command Surgeon
HQ USCENTCOM (CCSG)
U.S. Central Command
MacDill Air Force Base, FL 33608

Air University Library
(AUL/LSE)
Maxwell Air Force Base, AL 36112

U.S. Air Force Institute
of Technology (AFIT/LDEE)
Building 640, Area B
Wright-Patterson
Air Force Base, OH 45433

Henry L. Taylor
Director, Institute of Aviation
University of Illinois-Willard Airport
Savoy, IL 61874

Chief, National Guard Bureau
ATTN: NGB-ARS
Arlington Hall Station
111 South George Mason Drive
Arlington, VA 22204-1382

Commander
U.S. Army Aviation and Troop Command
ATTN: AMSAT-R-ES
4300 Goodfellow Bouvelard
St. Louis, MO 63120-1798

U.S. Army Aviation and Troop Command
Library and Information Center Branch
ATTN: AMSAV-DIL
4300 Goodfellow Boulevard
St. Louis, MO 63120

Federal Aviation Administration
Civil Aeromedical Institute
Library AAM-400A
P.O. Box 25082
Oklahoma City, OK 73125

Commander
U.S. Army Medical Department
and School
ATTN: Library
Fort Sam Houston, TX 78234

Commander
U.S. Army Institute of Surgical Research
ATTN: SGRD-USM
Fort Sam Houston, TX 78234-6200

AAMRL/HEX
Wright-Patterson
Air Force Base, OH 45433

Product Manager
Aviation Life Support Equipment
ATTN: SFAE-AV-LSE
4300 Goodfellow Boulevard
St. Louis, MO 63120-1798

Commander and Director
USAE Waterways Experiment Station
ATTN: CEWES-JM-MI-R,
CD Department
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

Commanding Officer
Naval Biodynamics Laboratory
P.O. Box 24907
New Orleans, LA 70189-0407

Assistant Commandant
U.S. Army Field Artillery School
ATTN: Morris Swett Technical Library
Fort Sill, OK 73503-0312

Mr. Peter Seib
Human Engineering Crew Station
Box 266
Westland Helicopters Limited
Yeovil, Somerset BA20 2YB UK

U.S. Army Dugway Proving Ground
Technical Library, Building 5330
Dugway, UT 84022

U.S. Army Yuma Proving Ground
Technical Library
Yuma, AZ 85364

AEFTC Technical Library
6510 TW/TSTL
Edwards Air Force Base,
CA 93523-5000

Commander
Code 3431
Naval Weapons Center
China Lake, CA 93555

Aeromechanics Laboratory
U.S. Army Research and Technical Labs
Ames Research Center, M/S 215-1
Moffett Field, CA 94035

Sixth U.S. Army
ATTN: SMA
Presidio of San Francisco, CA 94129

Commander
U.S. Army Aeromedical Center
Fort Rucker, AL 36362

Strughold Aeromedical Library
Document Service Section
2511 Kennedy Circle
Brooks Air Force Base, TX 78235-5122

Dr. Diane Damos
Department of Human Factors
ISSM, USC
Los Angeles, CA 90089-0021

U.S. Army White Sands
Missile Range
ATTN: STEWS-JM-ST
White Sands Missile Range, NM 88002

U.S. Army Aviation Engineering
Flight Activity
ATTN: SAVTE-M (Tech Lib) Stop 217
Edwards Air Force Base, CA 93523-5000

Ms. Sandra G. Hart
Ames Research Center
MS 262-3
Moffett Field, CA 94035

Commander
USAMRDALC
ATTN: SGRD-UMZ
Fort Detrick, Frederick, MD 21702-5009

Commander
U.S. Army Health Services Command
ATTN: HSOP-SO
Fort Sam Houston, TX 78234-6000

U. S. Army Research Institute
Aviation R&D Activity
ATTN: PERI-IR
Fort Rucker, AL 36362

Commander
U.S. Army Safety Center
Fort Rucker, AL 36362

U.S. Army Aircraft Development
Test Activity
ATTN: STEBG-MP-P
Cairns Army Air Field
Fort Rucker, AL 36362

Commander
USAMRDALC
ATTN: SGRD-PLC (COL R. Gifford)
Fort Detrick, Frederick, MD 21702

TRADOC Aviation LO
Unit 21551, Box A-209-A
APO AE 09777

Netherlands Army Liaison Office
Building 602
Fort Rucker, AL 36362

British Army Liaison Office
Building 602
Fort Rucker, AL 36362

Italian Army Liaison Office
Building 602
Fort Rucker, AL 36362

Directorate of Training Development
Building 502
Fort Rucker, AL 36362

Chief
USAHEL/USAAVNC Field Office
P. O. Box 716
Fort Rucker, AL 36362-5349

Commander, U.S. Army Aviation Center
and Fort Rucker
ATTN: ATZQ-CG
Fort Rucker, AL 36362

Chief
Test & Evaluation Coordinating Board
Cairns Army Air Field
Fort Rucker, AL 36362

Canadian Army Liaison Office
Building 602
Fort Rucker, AL 36362

German Army Liaison Office
Building 602
Fort Rucker, AL 36362

French Army Liaison Office
USAAVNC (Building 602)
Fort Rucker, AL 36362-5021

Australian Army Liaison Office
Building 602
Fort Rucker, AL 36362

Dr. Garrison Rapmund
6 Burning Tree Court
Bethesda, MD 20817

Commandant, Royal Air Force
Institute of Aviation Medicine
Farnborough, Hampshire GU14 6SZ UK

Defense Technical Information
Cameron Station, Building 5
Alexandra, VA 22304-6145

Commander, U.S. Army Foreign Science
and Technology Center
AIFRTA (Davis)
220 7th Street, NE
Charlottesville, VA 22901-5396

Commander
Applied Technology Laboratory
USARTL-ATCOM
ATTN: Library, Building 401
Fort Eustis, VA 23604

Commander, U.S. Air Force
Development Test Center
101 West D Avenue, Suite 117
Eglin Air Force Base, FL 32542-5495

Aviation Medicine Clinic
TMC #22, SAAF
Fort Bragg, NC 28305

Dr. H. Dix Christensen
Bio-Medical Science Building, Room 753
Post Office Box 26901
Oklahoma City, OK 73190

Commander, U.S. Army Missile
Command
Redstone Scientific Information Center
ATTN: AMSMI-RD-CS-R
/ILL Documents
Redstone Arsenal, AL 35898

Director
Army Personnel Research Establishment
Farnborough, Hants GU14 6SZ UK

U.S. Army Research and Technology
Laboratories (AVSCOM)
Propulsion Laboratory MS 302-2
NASA Lewis Research Center
Cleveland, OH 44135

Commander
USAMRDALC
ATTN: SGRD-ZC (COL John F. Glenn)
Fort Detrick, Frederick, MD 21702-5012

Dr. Eugene S. Channing
166 Baughman's Lane
Frederick, MD 21702-4083

U.S. Army Medical Department
and School
USAMRDALC Liaison
ATTN: HSMC-FR
Fort Sam Houston, TX 78234

Dr. A. Kornfield
895 Head Street
San Francisco, CA 94132-2813

NVESD
AMSEL-RD-NV-ASID-PST
(Attn: Trang Bui)
10221 Burbeck Road
Fort Belvoir, VA 22060-5806

CA Av Med
HQ DAAC
Middle Wallop
Stockbridge, Hants S020 8DY UK

Dr. Christine Schlichting
Behavioral Sciences Department
Box 900, NAVUBASE NLON
Groton, CT 06349-5900

Commander, HQ AAC/SGPA
Aerospace Medicine Branch
162 Dodd Boulevard, Suite 100
Langley Air Force Base,
VA 23665-1995

Commander
Aviation Applied Technology Directorate
ATTN: AMSAT-R-TV
Fort Eustis, VA 23604-5577

COL Yehezkel G. Caine, MD
Surgeon General, Israel Air Force
Aeromedical Center Library
P. O. Box 02166 I.D.F.
Israel

Director
Aviation Research, Development
and Engineering Center
ATTN: AMSAT-R-Z
4300 Goodfellow Boulevard
St. Louis, MO 63120-1798

Commander
USAMRDALC
ATTN: SGRD-ZB (COL C. Fred Tyner)
Fort Detrick, Frederick, MD 21702-5012

Director
Directorate of Combat Developments
ATTN: ATZQ-CD
Building 515
Fort Rucker, AL 36362